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INDIVIDUAL COUNSELING TO PROMOTE PHYSICAL ACTIVITY

BY

JOHN CRAIG HUDEC ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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Abstract

The transtheoretical model of behavior change provides a structure to use the best of many interventions to aid individuals to initiate and maintain physical activity (Prochaska, 1979). The intervention developed and evaluated in this study is a flexible series of counseling strategies aimed at helping those in the precontemplation, contemplation, preparation, action, or maintenance stages of that model to live an active life. Short-term counseling (Janis, 1983) and motivational interviewing (Miller & Rollnick, 1991) formed the basis for the individual counseling intervention. A stage specific intervention was applied to the five stages of physical activity behavior change. Informants were purposefully selected by proactive calls made to male staff and faculty members at a large western Canadian university. Informants were between 35 and 55 years of age. The intervention was evaluated at three points by conducting intensive ethnographic interviews which were transcribed and analyzed using content analysis. Where changes in behavior were expected, exercise behavior was evaluated by continuous single-subject logging. The single-subject data were presented graphically and evaluated by visual analyses. The intervention applied during Study One utilized counseling tools primarily to influence cognitive change. In the first study, each of the informants in precontemplation and contemplation made positive progress along the stage continuum. Although the informants in all three stages reported some positive changes in beliefs towards physical activity, the intervention was less positively reviewed by those in the preparation stage. The intervention for study two was modified based on the findings of the first study to encompass a broad range of physical activity measurement. In the second study the revised intervention with greater emphasis on behavioral processes had more positive influences on the beliefs and behavior of preparers. This intervention was also positively received by those in action and maintenance. Four of the six informants in the preparation and action stages reported positive changes in their stage following the intervention. In terms of strictly defined exercise behavior change, all but one informant reported positive effects associated with the intervention. The changes did not follow step-like progress which limited interpretations based on the single-subject methodology. Consequently, the quantitative data on attitudes and behavior were integrated with the qualitative information in conducting a series of in-depth case studies. As with stage change and beliefs, the latency and duration of changes in exercise behavior demonstrated individual variability. All informants perceived and reported positive effects of the intervention. These effects were supported by independent critiques of their individual data interpretations. Suggestions were presented to improve future counseling interventions and refine continued physical activity behavior research.

DEDICATION

My family provides the foundation for my efforts. I dedicate this work to them. To Dorian who encouraged me to continue my graduate studies. Little did she know what she was getting into. Her constant support has allowed me to experience both my growth as an academic and the growth of our family. To Mariah and Jonah who were both born and have grown during my efforts to achieve this milestone. In their own ways they have all contributed to this effort. I love you all and dedicate this work to you.

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Finally I would like to recognize the contribution made by the informants involved in this study. Without their full participation, the results of this research would be less meaningful. I appreciate their effort and sincerely hope that the intervention has contributed positively to their wellness.

CHAPTER 1

Introduction

This dissertation presents two studies conducted to investigate the utility of a counseling intervention for facilitating physical activity behavior change in individuals at different stages of change. The intervention was based on a combination of the transtheoretical, short-term counseling and motivational interviewing theoretical perspectives (Prochaska, 1979; Janis, 1983; Miller & Rollnick, 1991). The theories chosen as a basis for the intervention, were selected because they each allow for a stage specific intervention directed at individual behavior change. Although it has been suggested that these three theories might be applied in combination (DiClemente, 1991), to date there is a lack of empirical evidence to support such an approach.

The focus of study one was to develop, apply and investigate the effectiveness of a program of physical activity counseling aimed at individuals in the early stages of changing their physical activity behavior (i.e, precontemplation, contemplation and preparation). In this study, success of the intervention was assessed by changes in the beliefs about physical activity as interpreted from qualitative interviews and the general measure of stage change without specific attention to changes in physical activity behavior. The focus of study two was to develop, apply and investigate a program of physical activity counseling aimed at individuals in the later stages of changing their physical activity behavior. The stage of preparation was included again because of a lack of clear direction in the literature as to what form of intervention should be used with those in this stage. The two later stages of change, action and maintenance, were also included in the second study. The success of the second intervention was assessed by a qualitative evaluation of informants' beliefs about physical activity, specific changes in physical activity behavior, fitness changes and overall stage change. This research differs from previous exercise adherence research in that the focus was clearly on the individual. The studies were initiated to investigate *individual* physical activity counseling as a clinical intervention.

There is a lack of substantial evidence supporting physical activity counseling as an effective clinical intervention for increasing exercise adherence sufficient for the realization of the numerous benefits of regular physical activity. This research is an endeavor to improve physical activity counseling as a clinical intervention by applying contemporary theory on behavior change, while at the same time drawing information from the experiences of individuals who are in the process of changing their physical activity behavior, or have successfully changed their behavior.

This introductory chapter presents a review of literature essential to provide a foundation for the two studies that follow. Initial topics reviewed include: the importance of physical activity, the determinants of activity participation and physical activity counseling interventions and the grounding theories that provide the basis for the intervention. Next the relationships between attitudes, beliefs and behavior are reviewed providing a structure for their assessment. The chapter concludes with a discussion of the rationale for conducting the research

In the two succeeding chapters, the two studies are presented. The final chapter presents general conclusions and recommendations from the overall research.

The Importance of Physical Activity

A considerable amount of attention has been paid to the influence physical activity, or the lack of it, has on health and well-being. Numerous benefits of physical activity are documented (Dishman, 1982; Paffenbarger, Hyde, Hsieh & Wing, 1988; Blair, Kohl, Gordon & Paffenbarger, 1992; Dishman & Buckworth, 1996). Physical health benefits are the most strongly supported, but support is also present for psychological health, economic and community benefits.

The strongest research support concerning benefits of physical activity is provided for the cardiovascular health effects (Bouchard, Shephard & Stephens, 1994). Physical activity or rather the lack of it is supported as an independent risk factor for the development of cardiovascular disease (Center for Disease Control, 1993). Research also indicates that activity can contribute to the reduction of such risk factors as hypertension, poor blood lipid profile, diabetes and obesity (Fletcher et al., 1992; Blair, Kohl, Gordon & Paffenbarger, 1992). In addition to the cardiovascular benefits, Bouchard and others (1994) have reported direct benefits for treatment of diabetes, pulmonary disease, rheumatoid and osteo-arthritis. The prevention and rehabilitation of osteoporosis, chronic back pain, obesity, as well as several site cancers are supported by the literature (Bouchard et al., 1994: Deyo et al., 1986; Nachemson, 1990; Bray, 1990; Marcus, King, Clark, Pinto & Bock, 1996). As well, physical activity has been related to such other behaviors as smoking, nutritional and safety practices which impact health (Wankel & Sefton, 1993).

Several psychological health benefits of physical activity have also been confirmed. According to Brown (1990), these benefits fall into three categories: anxiety, reactions to stress and depression. In a 1994 review, McAuley asserts that physical activity has positive effects on mental health through increases in self-esteem, self-efficacy, psychological well being and cognitive function. A position statement released by the International Society of Sport Psychology summarizes the accepted influences of physical activity on mental health (1992). The society suggests that exercise is associated with reductions of state anxiety, levels of depression, neurotisism, trait anxiety and stress indices. This position statement asserts that the benefits of exercise apply for mental health across age levels and for both genders.

Physical activity has also been shown to have less tangible psychological benefits. These benefits include enhanced positive affect or mood (McAuley, 1994) and enjoyment (Wankel & Berger 1990, Wankel, 1993)

Numerous group benefits result from participation in physical activity. Families, industries and communities benefit if their members are active. There is evidence of familial aggregation in physical activity (Freedson & Evenson, 1991; Stucky & DiLorenzo, 1993). Children of active and less active parents exhibit physical activity patterns similar to their parents. It therefore seems evident that the same benefits received by parents would accrue to their children (Varni, 1983; Kuntzeleman, 1993; DeMarco & Sidney, 1989; Corbin, 1986). Evidence suggests that regular physical activity contributes to the development of self-efficacy and self-esteem (Fox & Corbin, 1989).

The benefits of physical activity have been extensively investigated within the work-place. Both private industry and the public service have demonstrated benefits attributable to physical activity. Shephard (1989) has reviewed the results of the literature and reports that work-place physical activity programs have been demonstrated to increase quality and quantity of production, decrease absenteeism and employee turnover. Other benefits include lower occurrence of work-place injuries, improved corporate image and recruitment potential and reduced medical costs. A net financial return for these benefits has been reported to be between two and five dollars per employee in a work-place wellness program, which incorporated a major physical activity promotion. Similar benefits have been demonstrated for both provincial and federal civil servants (Government of Saskatchewan, 1989; Chow, 1991).

Communities have been shown to benefit from an active population. Social benefits derived through sport and physical activity are advanced through personal enjoyment, personal growth, social harmony and desirable social change (Wankel & Berger, 1990). Physical activity programs can contribute to positive personal, neighborhood and community attitudes which each contribute to satisfaction and enhanced quality of life (Allen & Beattie, 1984; Allen, 1991). Increased activity involvement within a community has been shown to lead to reductions in alcohol and chemical dependencies which in turn contributes to the well-being of a community (Murray, 1986).

The Problem of Adherence

Although many benefits of physical activity are well demonstrated, much of the population is not motivated to become active or maintain regular physical activity. There is a wide range of adherence reported in the literature. Stephens, Jacobs and White (1985) in reviewing eight national studies concluded that only 20% of the North American population are active at a level demonstrated to achieve cardiovascular health. An additional 40% of the population was active to a lesser degree. This would suggest that 40% of the population is sedentary. Although there was a significant increase in the proportion of Canadians who followed an active lifestyle in the late 1980's, two thirds of the population fell short of an activity level necessary to maintain cardiovascular health (Stephens & Craig, 1989). A later review of population studies in four countries (Australia, Canada, Finland and the United States) reported that between 16 to 43 percent of the population remained sedentary (Caspersen, Merritt & Stephens, 1994). Although the trend is improving many individuals fall short of the physical activity levels required for maintain health. Beyond this survey information, direct evidence from adherence studies indicates that typically 50% of those who initiate an activity program drop out within the first year. Clearly a new approach is needed to provide assistance for those who desire to become active. This problem of continued low physical activity participation rates at levels that would produce health benefits has focused attention on the need to study the factors which influence participation.

Determinants of Activity Participation

A review was conducted on the determinants of physical activity and exercise in 1994 by Dishman and Sallis. This review of determinants provides those planning interventions with an overview of strategies that hold the most promise for successful application. This review classified determinants as demographic, cognitive, behavioral, social environmental, physical environmental, or activity related. This review rated the evidence supporting the relationship of each determinant to physical activity participation on a six-point scale. The determinants strongly supported as positively, negatively, or not related to physical activity are reported in this section. They received strong support because of repeated findings support of an association, or a lack of association. Table One summarizes the literature pertaining to physical activity in both supervised and free-living environments.

TABLE 1

Summary of the Strongly Supported Determinants of Physical Activity

Variables	*(+) Association*	*No Association*	*(-) Association*
Demographic	Education	Overweight/Obesity	Blue collar
	Male gender		Age
			Non-White race
Cognitive	Invitation to exercise		Barriers to exercise
	Perceived health/fitness		Lack of time
	Self-Efficacy		Mood disturbance
	Self-Motivation		
	Self-Schemata		
Behavioral	Past free-living activities(adulthood)	School sport	Smoking
	Past program participation		
Social Environmental	Social support (friends/peers)		
	Social support (spouse/family)		
Physical Activity Characteristics			Perceived effort

Five of the six categories of determinants contain factors strongly supported as influencing physical activity participation (Dishman & Sallis, 1994). Demographic variables demonstrate continued support for both positive and negative factors that predetermine levels of activity rather than cause changes in physical activity. In the cognitive category self-efficacy has the strongest support across both supervised and community samples. Self-schemata, expectations of benefits and intention to be active are strongly supported among community samples. Although in Dishman and Sallis' review attitudes and knowledge were not identified as having a strong relationship to activity, more recent reviews (Godin, 1994, 1994a) have documented a more positive relationship. A measure of self-motivation has also been associated with activity. The two cognitive variables supported as having negative influences on activity behavior are perceived barriers and mood disturbance. The only behavioral variable consistently associated with physical activity behavior is adult program participation. The same level of support has not been established for adult participation in free-living activity or participation in activity as a child. The social variables demonstrated to be most positively associated with physical activity include social support from friends and family. Perceived effort is negatively associated with physical activity as the factor most strongly supported within the activity related category of determinants.

Research to date has not demonstrated strong support for physical environment influences on physical activity. The lack of support for physical environmental influences is more likely due to a lack of research than a lack of effect. Recent research adds strength to the contention that environmental variables influence physical activity (Sallis, Johnson, Calfas, Caparosa & Nichols, 1997). Continued research is needed to elaborate the separate and interrelated effects of various determinants influencing physical activity participation.

Physical Activity Counseling

Historically, research on interventions to enhance physical activity involvement has largely ignored the role of individual adherence counseling. In the field of practice, counseling has played a limited role in fitness leadership. Physical activity counseling has been defined in broad terms, but with a great deal of attention to the assessment of fitness and prescription of a program of regular exercise to facilitate improvements in the level of fitness (Willis & Campbell, 1992). Those who provide exercise counseling are generally trained in the physiology of exercise but frequently lack knowledge of psychological theories and principles pertinent to exercise behavior.

Recently more emphasis has been placed on the importance of psychological information and counseling skills to fitness leaders as evidenced by initiatives by such organizations as Fitness Canada and The American College of Sports Medicine. Both organizations have adopted the position that in order to facilitate lifestyle change, fitness counseling should include the provision of behavioral information. Prior to 1987, Fitness Canada paid little attention to fitness counseling in its standardized test of fitness. In that year an interpretation and counseling manual was released, drawing attention to the importance of counseling (Fitness Canada, 1987). It provided an overview of counseling skills, derived from scientific sources, but the sources were general in nature with little definitive attention to physical activity (Carkuff, 1969; Egan, 1990; Eisenberg & Delaney, 1977). To date, no systematic evidence has been provided concerning the utility of this approach for assisting individuals to make desired changes in their activity involvement. In 1988 The American College of Sports Medicine (ACSM) directed additional attention toward human behavior and psychology, as information on the principles of health behavior change, group exercise psychology and exercise adherence were included in their resource manual (Blair, Painte, Pate, Smith & Taylor, 1988). The changes in these two programs devoted to exercise prescription suggest an increased acceptance of psychological principles and their critical role in establishing long-term exercise behavior. This attention, however, has been limited and generally overshadowed by physiological testing and the prescription of exercise.

To support such attention to fitness counseling and evaluation in Canada another step was taken. The Canadian Society for Exercise Physiology (CSEP) in conjunction with Fitness Canada produced the Canadian Physical Activity and Lifestyle Appraisal Manual (1996). The manual incorporates sound psychological theory including attention to the stages and processes of change and to counseling strategies and thus, expands on the Fitness Canada's (1987) Canadian Standardized Test of Fitness: Interpretation and Counseling Manual. It is significant that attention is expanded on the topic of behavior change and helping people change.

Much of the attention focused on physical activity counseling has been directed specifically at investigating health-care provider counseling. Health-care providers have the opportunity to provide lifestyle counseling to a large proportion of the population. Primary care physicians and nurses combined have annual contact with more than 80% of the population (Pender, Sallis, Long & Calfas, 1994). According to several studies, this group of health-care providers is perceived by the population as a knowledgeable and trusted source of health information (Perrier, 1979; Secker-Walker, Chir, Solomon, Flynn & Dana, 1994).

The role of physicians in physical activity counseling interventions should not be overlooked. The reported prevalence of physical activity counseling is extremely variable, due to differences in, or the lack of a clear definition of counseling. With numerous definitions considered, 15 to 84 % of primary-care physicians say they counsel their patients, about physical activity, for periods of three to five minutes (Wells, Lewis, Leake, Schleiter & Brook, 1986). A national sample of family practice physicians reported that exercise counseling was very prevalent, but slightly less common than specific smoking and weight control counseling (Mullen & Tabak, 1989). Over 92% of physicians reported that they provided some form of exercise counseling. The techniques used by these physicians included suggestion of specific steps, repeat mention at later visits and referral to others within, or outside the office for further counseling. A variety of barriers are reported to impede effective physical activity counseling by primary-care providers. Pender et al. (1994) cite barriers such as lack of time, reimbursement, standard protocols, perceived effectiveness and appropriate training. These barriers demonstrate some of the practical limitations of providing physical activity counseling through traditional health providers.

Physicians do have a role to play in influencing the physical activity of patients. A study of healthy adults indicated that the informants felt that (a) their personal physician wanted them to exercise and (b) they would be motivated by this advice to become physically active (Godin & Shephard, 1990). It was also found that physicians who were trained to deliver brief exercise advice had a significant effect on duration, but not the frequency of activity of their patients one month following the counseling (Godin & Shephard, 1990).

The Physician-Based Assessment and Counseling for Exercise Program (PACE) was developed to assist primary-care physicians to counsel apparently healthy adults about the adoption and maintenance of physical activity (Patrick, Sallis, Long, Calfas, Wooten, Heath & Pratt, 1994). The PACE program was successfully piloted and underwent controlled study to determine its effectiveness (Calfas, Long, Sallis, Wooten, Pratt & Patrick, 1996; Long, Calfas, Wooten, Sallis, Patrick, Goldstein, Marcus, Schwenk, Chenoweth, Carter, Torres, Palinkas & Heath, 1996). This program addressed many of the barriers to physician counseling, focused attention on the stage of preparedness and taught physicians the most effective behavior change skills (Patrick et al., 1994). The PACE program is not only a physician directed counseling program. The program is designed to utilize the motivating influence possessed by physicians in conjunction with allied health-care providers such as nurses and other office staff, so that the majority of patient contact is with allied health professionals. Patient assessment, individual attention and follow-up are conducted by these non-physicians (Long, Wooten, Patrick, Calfas, Sharpe & Sallis, 1992). The team approach to counseling, utilizing the physician as a catalyst, deserves continued attention. Programs such as the Pawtucket/Miriam Hospital Heart Health Program (Marcus, Taylor & Simkin, 1992) and the Heart-Avon/University of Bristol, Get Moving Program (Naylor & Simmonds, 1994) have been applied in clinical settings but have not been evaluated for effectiveness as was done with the PACE program.

Stages of Behavior Change

The transtheoretical model of behavior change was developed in an attempt to integrate the important constructs from various psychotherapy theories (Prochaska, 1979). The model incorporates a number of psychological approaches into a cognitive-behavioral basis for intervention. It integrates the concept of stages of behavior change, with processes that can guide behavior change (Prochaska & Velicer, 1997).

Individuals can be located in various stages of preparedness for making lifestyle change (Prochaska, Norcross & DiClemente, 1995, pp. 47). Stage theory labels individuals in one of six stages; precontemplation, contemplation, preparation, action, maintenance, or relapse. The stages are described in Table 2.

TABLE 2
Definition of the Stages of Behavior Change

Stage	***Definition***
Precontemplation	Period in which the individual is not thinking of making the targeted behavioral change within the next six months.
Contemplation	Period of time in which the individual is seriously thinking of making the targeted behavior change within the next six months.
Preparation	Period of time in which the individual is seriously thinking of making the targeted behavior change in the next month. Individuals may exercise some but not regularly in this stage.
Action	Period from behavior change for six months following the change when the behavior change is maintained.
Maintenance	Period from six months post behavior change onward that the behavior change is maintained.
Relapse	Any point following a behavior change when behavior reverts to one of the earlier stages.

From Prochaska & DiClemente, 1983; Marcus & Simkin, 1993

Development of the stage model was based upon research with smokers and their efforts to change smoking behavior (Prochaska, 1979). This integrative model of change was initially applied to individuals attempting to change smoking habits on their own (DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983). The initial research identified stages of change and further suggested that ten processes of change were applied with different emphasis across these initial stages of change.

The processes are hierarchically organized into two higher order constructs: experiential and behavioral processes (Prochaska, Velicer, DiClemente & Fava, 1988). The experiential processes focus on producing cognitive change, while the behavioral processes concentrate on producing behavioral change. The experiential processes include: consciousness raising, dramatic relief, environmental reevaluation, self -reevaluation and social liberation. The behavioral processes include: counterconditioning, helping relationships, reinforcement management, self-liberation and stimulus control. The ten processes are briefly defined in Table 3.

TABLE 3
Definition of the Processes of Change

PROCESS	***DEFINITION***
Consciousness Raising: (E)*	Increasing information about self and problem.
Counterconditioning: (B)*	Substituting alternatives for problem anxiety-related behaviors.
Dramatic Relief: (E)*	Experiencing and expressing feelings about one's problems and solutions.
Environmental Reevaluation: (E)*	Assessing how one's problems affect physical environment.
Helping Relationships (relationship fostering): (B)*	Being open and trusting about problems with someone who cares.
Reinforcement Management (contingency management): (B)*	Rewarding oneself or being rewarded by others for making changes.
Self-Liberation: (B)*	Choosing and committing to act or believe in ability to change.
Self-Reevaluation: (E)*	Assessing how one feels and thinks about oneself with respect to a problem.
Social Liberation: (E)*	Increasing alternatives for non-problem behaviors available in society.
Stimulus Control:(B)*	Avoiding stimuli that elicit problem behaviors, add stimuli that encourage alternative behaviors.

* B= Behavioral Processes   E= Experiential Processes

Adapted from Prochaska, Norcross, Fowler, Follick & Abrams, D.B. (1992). p. 37

It was observed that individuals who were successful in modifying their smoking behavior emphasized the processes differently at different stages of change (Prochaska & Marcus, 1994). The experiential processes were emphasized in the early stages when changes are generally cognitive in nature. The behavioral processes were utilized most extensively in the later stages of behavior change. Prochaska and colleagues utilized these observations from successful changers to suggest different behavior change interventions appropriate to different stages of change (Prochaska, DiClemente & Norcross, 1992).

Recently the stage model has been applied to exercise behavior and the promotion of physical activity by a number of authors. As mentioned previously stage based, clinical interventions such as the Pawtucket/Miriam Hospital Heart Health Program (Marcus, Taylor & Simkin, 1992) and the Heart-Avon/University of Bristol, Get Moving Program (Naylor & Simmonds, 1994) have been applied without evaluation. The Project Pace program has been piloted, refined and evaluated. A significant intervention effect on monitored activity and readiness to adopt physical activity was observed (Calfas, Long, Sallis, Wooten, Pratt & Patrick, 1996). The first step in the PACE program is an assessment of the motivational readiness of the patient prior to counseling. An 11-item self-report questionnaire classifies patients as a precontemplator, a contemplator, or an active. Following the assessment one of three protocols is applied depending on the stage of motivation. This program encourages spending the most time with contemplators who are ready to change but need assistance to be successful (Pender, Sallis, Long & Calfas, 1994). A study conducted by Marcus and colleagues has demonstrated progress along the stage continuum following an intervention. They replicated this effect in randomized controlled trials and began to look for effective low-cost applications for stage based interventions (Marcus, Banspach & Lefebvre, 1992; Marcus, Emmons & Simkin, 1994; Marcus, Bock & Rossi, 1994).

The prevalence of the different stages in a work-place sample has been reported by Marcus, Rossi, Selby, Niaura and Abrams (1992). Twenty four percent of the population was in precontemplation, 33% in contemplation, 10% in preparation, 11% in action and 22% in maintenance. This represented a primarily blue-collar population with a minimum of high school education level, one third of which was male. In a Canadian sample the proportions reported for the five stages were 15% precontemplators, 7% contemplators, 18% in preparation, 32% in action and 28% in maintenance (Godin, Desharnis, Valois & Bradet, 1995). In a large survey of the Australian population stage proportions were reported as in precontemplation, 10% in contemplation, 16% in preparation, 23% in action and 38% in maintenance (Booth, Macaskill, Owen, Oldenburg, Marcus & Bauman, 1993). The variability of the above reports suggests that demographic make-up influences stage prevalence, in a particular sample.

Short-Term Counseling

A counseling approach has been developed based on the hypothesis that effective counseling must help individuals to solve their own problems (Egan, 1990). Based on French and Raven's (1959) theory of social power, Janis (1983) developed a counseling strategy named short-term counseling. Short-term counseling aims to develop a mutually acceptable helping relationship between a counselor and the client. According to Janis (1983) in order to be effective a counselor must be perceived as dependable, likable and knowledgeable. Short-term counseling utilizes three phases. Initially motivating power should be established. Next the motivating power should be used to bring about behavior change. Finally motivating power should be maintained and the motivation should be internalized. Table 4 outlines the three phases and some suggested counseling actions for progressing through the phases of the model.

According to Janis and Mann, people choose between five coping strategies (1982, pp. 50-51). The first coping strategy is to continue present action, ignoring new information. This strategy is labeled unconflicted adherence. Unconflicted change to a new course of action is the second strategy. With this option the client uncritically adopts an action. Defensive avoidance is a third option. Procrastination, shifting responsibility and other such forms of avoidance exemplify this option. Hypervigilance is the fourth possible coping strategy. With this option, actions such as frantic searching and the resultant hasty solutions are common. The final coping strategy, vigilance, is typified by examination of unbiased information and the careful consideration of choice. The presence or the absence of several considerations determines the choice between five coping patterns. An awareness of serious risk is considered. The arousal or conflict produced by this awareness influences the coping choice. A sense of optimism for finding better alternative choices is the second determinant of the selected coping strategy. Finally the perception of time pressure influences the coping strategy elected. The belief that time is adequate for searching for information and deliberating prior to a decision is critical to the choice of a coping method. The choice of coping strategy and present considerations of the client act as tools for the utilization of motivational power and guide judgement or readiness for independent success.

TABLE 4

Phases and Variables that Determine Motivating Power of Counselors as Change Agents

CRITICAL PHASES	*KEY VARIABLES*
Phase 1: Building up motivating power	Encourage self-disclosure. Give positive not negative feedback. Disclosure for insight and cognitive restructuring.
Phase 2: Using motivating power	Directive statements & recommendations for action. Elicit commitment to recommended action. Connect recommended norms to a respected group. Selective positive feedback & contingent approval. Build sense of personal responsibility.
Phase 3: Retain motivating power and promote internalization	Continued attitude of positive regard. Real or perceived means of future contact. Reminders of the sense of personal responsibility. Build self-confidence for independent success.

Adapted from Janis (1983, p.27)

Short-term counseling has been used as an exercise intervention. Wankel, Bocksnick, Tubman and Jagielski (1994) have developed a physical activity counseling program based on Janis` (1983) guidelines for short-term counseling. The counseling program stressed the development of referent power by the counselor to help individuals adopt and maintain regular physical activity. The program included components pertaining to: decision-making, goal-setting, attribution and self-efficacy training, social support building, self-monitoring and self-reinforcement and relapse prevention. Generally this program was positively received and had beneficial effects for a number of clients, but a number of individuals did not fully "buy into" the counseling program. Wankel and his colleagues (1994) interpreted the findings in terms of the transtheoretical model of behavior change, concluding that those in the first three stages of change, precontemplation, contemplation and preparedness, were not yet ready to take action toward lifestyle change and therefore did not respond to the intervention. Further research is required to substantiate this interpretation.

Motivational Interviewing

Miller and Rollnick (1991) presented a counseling format based upon a framework similar to the short-term counseling approach. The motivational interviewing approach has been utilized primarily with negative addictive behaviors such as substance abuse and other problem behaviors. The basic philosophy and skills orientation are comparable to the approach suggested by Janis (1983). There are two reasons to present the motivational interviewing methodology as an extension of short-term counseling. The motivational interviewing system makes the assumption that most individuals do not enter counseling in a state of readiness to change their behavior pattern. To accommodate the range of readiness for change the transtheoretical model of behavior change has been applied in conjunction with motivational interviewing (Rollnick, Heather, Gold & Hall, 1992; Heather, Rollnick & 1993). The second reason for recommending brief motivational interviewing is its focus on developing a practical menu of strategies for directing individual behavior change. Motivational interviewing describes a patient-centred intervention specifically for use amongst clients with varying degrees of readiness to change (Rollnick, Heather & Bell, 1992). Motivational interviewing is unique in its development of a menu of strategies to deal with ambivalence and the varying degree of readiness to change behavior.

The practical form of counseling proposed by Miller (1983) was the first statement of the principles and strategies involved in motivational interviewing. Personal control and responsibility are key themes. Client control is emphasized, as it is believed that personal control over behavior is critical to the successful modification of behavior (Haynes & Ayliffe, 1991). The goal of motivational interviewing is to explore conflicts, encourage expression of reasons to change and arguments to change (Heather, Rollnick & Bell, 1993). The prevalence of feelings of ambivalence toward behavior change establishes this ambivalence as the major target of motivational interviewing. The major objective is to reduce these feelings of ambivalence.

There are five general principles of motivational interviewing (Miller & Rollnick, 1991). They are as follows: 1) express empathy, 2) develop discrepancy, 3) avoid argumentation, 4) roll with resistance, 5) support self-efficacy. The process of motivational interviewing allows expression of empathy by incorporating reflective listening with acceptance as a facilitator of change. Discrepancies are highlighted between present behavior and individual goals as a form of motivation. From this discrepancy clients should be able to recognize the need for change and develop reasons for doing so. Argumentation is avoided as it is deemed to be counterproductive to change. If clients become defensive or resistant to change it is a sign for the counselor to change strategies. By rolling with resistance Miller and Rollnick (1991) mean that momentum should be used to the advantage of change, perceptions should be shifted. The client should provide a resource for finding solutions to problems. Developing beliefs that change is possible support self-efficacy. The client is responsible for choosing to change and carrying out the actions to change. Presenting a number of alternatives to clients increases their options as a means of creating self-efficacy.

The motivational interviewing approach de-emphasizes labeling, shifting emphasis to personal choice and responsibility for decision making (Miller & Rollnick, 1991). The counselor makes objective evaluations, while avoiding behaviors that facilitate resistance. When resistance is encountered, it is met with reflection. Actions are initiated following negotiation between the counselor and the client. Goals and change strategies must be accepted by both parties to be effective. The differences in motivational interviewing as compared to confrontational, skill training and nondirectional counseling approaches are summarized in Table 5.

Table 5
How Motivational Interviewing Differs from Other Counseling Styles

COMPARISON	*FEATURE*
As Compared to Confrontational Styles	De-emphasis on labels. Emphasizes personal choice & responsibility. Objective therapist evaluation. Resistance part of relationship with therapist. Resistance met with reflection. Goals and change strategies negotiated. Client acceptance of goals vital.
As Compared with Skill Training Styles	Specific principles & strategies to build motivation. Explore & reflect client perceptions without labeling. Responsibility for change left with client (no training, modeling or practice). Elicits strategies from client & significant others. Natural problem solving strategies come from client.
As Compared to Nondirective Styles	Systematically directs client to motivational change. Offers counselor's advice & feedback if appropriate. Empathetic reflection used selectively to reinforce. Create and amplify client discrepancies to motivate.

(Modified from Miller and Rollnick, 1991)

The motivational interviewing approach incorporates insights and strategies from "Rodgerian" and other non-directive approaches, but differs in numerous ways (Miller and Rollnick, 1991). The approach is client-centred and it is flexible to meet individual need, but it also has a directive aspect. Counselors have direct goals and pursue specific strategies to achieve them. In this pursuit, counselor feedback and advice are given. Empathetic reflection is used to emphasize some points while de-emphasizing others, focusing in on problem behaviors. In this more directive approach counselors work to create discomfort and discrepancy rather than waiting for the client's offerings.

Rollnick and others have investigated combining the motivational interviewing approach with readiness to change questionnaires (Rollnick, Heather, Gold & Hall, 1992;

Heather, Rollnick & Bell, 1993). They theorize that readiness to change lies on a simple linear continuum rather than a set of discrete stages as postulated by Prochaska and DiClemente (1986). DiClemente (1991) suggests the application of motivational interviewing in each of the stages of behavior change. The strategies of this approach are particularly applicable to those in the contemplation stage. Here a decision balance approach with provision of information and incentives can help clients work through ambivalence, anticipated barriers and the appeal of problem behaviors. These factors can be replaced with feelings of self-efficacy and stage effective behavior change strategies.

Motivational interviewing would appear to be time well spent preparing people for change. The brief, client-centred interviewing approach has demonstrated favorable outcomes (Kaplan, Greenfield & Ware, 1989; Ockene, Kristeller, Goldberg, Amick, Pekow, Hosmer, Quirk & Kalan, 1991; Stewart & Roter, 1989). Clinical application provides the majority of support for the efficacy of motivational interviewing. Much like the application of stage of change interventions, motivational interviewing interventions have concentrated on the reduction of problem behaviors rather than the expansion of positive lifestyle behaviors (Miller & Rollnick, 1991). Alcohol and drug abuse are the primary foci of clinical application with limited application directed at sexual offenders and HIV risk reduction. The adoption of positive behaviors, such as regular physical activity, has received inadequate attention. Additional research is required to establish the effectiveness of this client-centred approach.

Attitude, Beliefs and Physical Activity Behavior

Although there are a number of different theories devoted to the relationship of beliefs, attitudes and behavior, this discussion is limited to the theory of planned behavior and its predecessor the theory of reasoned action. These theories have generated an abundance of research and have garnered considerable empirical support across a wide range of situations and types of behavior (Ajzen & Fishbein, 1977, 1980; Ajzen, 1991; Ajzen & Driver, 1991, 1992). In addition the theories have been applied in physical activity research across a variety of settings (Godin, 1993, 1994) and have been used to help interpret movement from one stage of behavior change to another (Godin, Desharnais, Valois & Bradet, 1995).

The theory of reasoned action as proposed in 1977 by Ajzen and Fishbein suggests that people are usually rational and make systematic use of the information available to them, considering the implications of an action before engaging in it. The theory is based on the assumption that most important social behaviors are based on voluntary control and that intention is the immediate determinant of such behavior. Further, intention is determined by the individuals' attitude about performing the relevant behavior and subjective norm, the person's perception of social pressure to perform, or not perform the behavior. Attitude in turn is determined by behavioral beliefs concerning the perceived consequences of action weighted by an evaluation of those consequences. Similarly, subjective norm is a function of normative beliefs, the individual's beliefs about what others think should be done with respect to the behavior, weighted by the motivation to comply with those significant others. The theory of reasoned action does not directly incorporate external variables which may influence the degree of perceived control. External variables are related to behavior only when they feed into other specific model variables such as the behavioral beliefs, subjective evaluations, normative beliefs, motivation to comply, or relative contributions of attitudes and subjective norms. As an example, the demographic variable of education influences the normative beliefs about physical activity. The subjective norm in turn influences the intention to be active and finally the active behavior.

The general utility of the theory of reasoned action has been supported for the prediction of both intention and behavior (Shephard, Hartwick & Warshaw, 1988; Godin & Shephard, 1990). Concerns have been expressed about the theory's ability to predict behaviors not completely under volitional control (Ajzen, 1985). These concerns lead Ajzen to revise and extend the theory into the theory of planned behavior.

In the revised theory a perceived control component is proposed as a third determinant of intention. Like the attitudinal and normative components of the original theory the concept of perceived behavioral control influences intention and in turn behavior (Ajzen, 1985; Godin, 1994). The concept of perceived behavioral control reflects the perceived difficulty of adopting a behavior and the availability of the needed resources to accomplish the intended behavior. This third component makes the theory applicable to behaviors of variable volitional control. For behaviors outside of volitional control, a direct pathway is proposed between perceived behavior control and behavior. This suggests a direct pathway to behavior without the formation of intention (Ajzen, 1991).

The theory of planned behavior is supported as a relevant theory for the prediction of exercise adherence. The addition of perceived limitations to exercise adds significantly to the predictive ability of the attitudinal and normative components of the theory of reasoned action (Godin, 1994). The theory of planned behavior's usefulness for exercise promotion needs further research, but has shown application when combined with stage theories (Godin, 1994). Stages ranging from precontemplation to maintenance can be differentiated using the theory of planned behavior, into the attitudinal, normative and control components. This type of utilization shows the possibility of practical application to exercise adherence interventions, including counseling interventions.

Need for the Research

Although the previous review of literature provides the underlying rationale for the program of research to follow, this section will briefly address the need for the particular type of research undertaken. First, a rationale for continued physical activity adherence research will be provided. Next the justification for applying individual face-to-face counseling will be summarized followed by the rationale for using an individually based qualitative research methodology. The need to develop psychologically based programs and interventions will be discussed, together with the rationale for selecting the three guiding theoretical perspectives.

As indicated in the previous review, research has demonstrated many benefits associated with regular physical activity and exercise. Although this information has been disseminated to the public, a large percentage of the population remains sedentary or has difficulty maintaining regular physical activity. Despite considerable attention to the determinants of physical activity and attempts to develop interventions to promote physical activity, the problem persists.

In 1991, Dishman reviewed 56 interventions intended to influence physical activity behavior. The studies utilized behavior modification or cognitive behavior modification to increase and maintain physical activity. Although these methods were shown to increase the frequency and the amount of physical activity, changes in fitness, morbidity, mortality and therapeutic outcomes were not demonstrated. A further limitation is that the results of many studies are not applicable to general populations due to the unrealistic settings in which many of them were conducted. It is critical to extend the findings to real life situations to determine their clinical usefulness. Studies are needed which examine practical and realistic ways to promote physical activity to individuals who are difficult to influence. An example of such a program is the PACE program (Calfas, Long, Sallis, Wooten, Pratt & Patrick, 1996). Such a practical approach should be extended to improve its utility. Many of the barriers to physician-based counseling can be removed by extending such approaches for application by allied health promotion practitioners

Human behavior is complex: what benefits one, may hamper another's progress in adopting and maintaining healthy behavior. Accordingly a more individualized approach to interventions may be more effective in promoting physical activity than the more standardized approaches typically used in the past. Several authors have recommended the use of an individual reactive counseling approach in contrast to a more typical physiological, prescriptive approach (Dishman, 1988, 1991; Rejeski & Kenny, 1989; Dubbert, 1992; and Willis & Campbell, 1992). It has been suggested that brief individual counseling can improve adherence rates when lifestyle interventions are applied (Janis, 1983; Wankel, 1988). Moreover, brief individual counseling can be practically applied. It can sustain more client-counselor interaction and greater program flexibility than the majority of previous interventions (Wankel, 1990). This flexibility allows for the development of individual strategies for the adoption and maintenance of physical activity.

A qualitative methodology was adopted for this research with the objective of gathering rich data which would inform future counseling interventions. The use of qualitative interviews allowed for comparison across the stages of behavior change and across the issues essential to adoption and maintenance of physical activity. The research took place in a natural setting, attempting to describe the behavior and secondarily to analyze it. The majority of concern was directed at the process with additional concern for outcomes. The data analysis and interpretation attended to both what happened and why it happened. This emphasis conforms to the objectives of qualitative research laid down by Bogdan and Biklen in 1992.

By studying a small number of participants in-depth this research differs from past efforts in that it emphasizes the importance of a reactive approach, reacting to stage, situational and personal factors to provide a customized intervention approach. Although this has been attempted to a degree in the past, limited success has been achieved due to the imposition of group designs to study a question better approached using intensive qualitative investigation supported by quantitative validation.

This research was conducted to investigate the utility of a counseling intervention which derived its focus from psychological literature applicable to physical activity adherence. To date, the literature addressing physical activity counseling has been largely prescriptive, physiologically based and scientifically untested with respect to its behavior changing effectiveness (Dishman, 1988; Willis & Campbell, 1992). There is a need to shift some of the attention from the determination of physical fitness and the prescription of exercise to the development of methods to assist the sedentary to become active and to aid the active to maintain or solidify their involvement (Rejeski & Kenney, 1989; Dishman, 1991; Dubbert, 1992). There is a particular need to develop counseling interventions based upon sound psychological theory. A computer-based search of the literature supports the contention that inquiry in this area is lacking.

Although there are other theories that could be used in a counseling intervention, the transtheoretical model provided the structure of the interventions to follow. It was selected because of its focus on change, its flexibility to apply to widely divergent individuals and its popularity in different areas of lifestyle change (Prochaska & Velicer, 1997). Rather than molding the client's needs to match the counseling model the counselor should draw from the available theory to match the needs of the client. Several authors have indicated the need to pay particular attention to the stage of readiness for change when providing practical physical activity counseling interventions (Sallis, Patrick, Long, Wooten, Calfas & Sharp, 1992; Hills, 1993; Marcus & Simkin, 1993; Godin, Desharnais, Valois & Bradet, 1995). The transtheoretical theory suggests that individuals in the early stages of change use different processes to change their behavior than do those in the later stages of change (Prochaska et al., 1988). This suggestion provided a division point for the two studies in this research program. In study one counseling concentrated on actions to aid informants to make changes in their attitudes and beliefs about physical activity. In the second study the counseling focused on helping informants change their behavior.

While the transtheoretical model with its stages of change and processes of change particularly relevant to the various stages, provided the basic framework for the intervention, it was supplemented by two additional theories. Short-term counseling (Janis, 1983) provides a model for assisting informants to solve their own problems. This is accomplished within a helping environment which develops motivating power, utilizes the motivation and attempts to maintain the motivation by internalizing it. Motivational interviewing (Miller & Rollnick, 1991) provides a foundation on which to integrate the stage theory and short-term counseling into a practical strategy for developing change. In addition, the motivational interviewing format allows for the integration of both directive and non-directive interviewing. Personal control is maintained by the informant, while conflicts with reality are explored and reasons to change are negotiated. As DiClemente (1991) suggests, motivational interviewing provides an applied model to facilitate the processes of change within the unique course of change in each case.

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CHAPTER 2

Development and Implementation of a Fitness Counseling Protocol for Individuals in the Early Stages of Behavior Change

Introduction

The purpose of the first study was to develop, apply and evaluate the effectiveness of a counseling intervention program for facilitating the physical activity involvement of individuals in the early stages of behavior change.

The intervention was designed to assist individuals to progress from their current stage of behavior to a higher stage on the continuum of stages of behavior change. A successful intervention with a client would be evidenced by his progressing to a higher stage of change. A qualitative approach involving multiple interviews with each informant enabled examination of both the process and outcome of the intervention. The study examined the intervention influence, changes in beliefs and advice to others from these informants who were at a variety of places on the stage of change continuum.

The counseling intervention was built upon a strong theoretical base, but at the same time emphasized both practicality and reactivity to the needs of target individuals. This research differed from previous investigations in that it applied information from client interviews and considered individual counseling needs. Three theories provided the theoretical base for the individual counseling. "Short-Term Counseling" (Janis, 1983) and "Motivational Interviewing" (Miller & Rollnick, 1991) guided the technique or methodology employed in the counseling sessions. The "Stage Theory" (Prochaska & DiClemente, 1984) provided a template for application of counseling across a progressive series of health related behavior changes.

Stage theory suggests that change can be classified into six stages along a continuum. As previously discussed in Chapter One, individuals categorized into the first three stages of change have distinct characteristics. Those in precontemplation are not considering change. Individuals in contemplation are considering changing behavior within the next six months, while those in preparers are participating in the target behavior but not at the required level. At any point people can relapse to behaviors that place them in one of the earlier stages which would classify them as a relapser. Categorizing people according to stage theory establishes a framework for anticipating the type of changes they will undergo with the intervention program. Precontemplators and contemplators are expected to make changes in their beliefs and attitudes towards physical activity, but not their behavior. Preparers are expected to utilize both cognitive and behavioral processes to achieve desired changes. All individuals are expected to benefit from the counseling program and to progress along the stages of change continuum towards regular physical activity behavior. Successful achievement of the research objectives depends on each informant achieving personal benefits from counseling. The measurement of change is dependent on information gleaned from interviews and support by the informants of a critique of the counselor's interpretations. Based on previous research, the focus of early stage interventions was placed on influencing attitudes (Marcus, Selby, Niaura & Rossi, 1993; Prochaska, Velicer, Rossi, Goldstein, Marcus, Rakowski, Fiore, Harlow, Redding, Rosenbloom & Rossi, 1994). Attention to changing behavior was left to a subsequent intervention designed to pay particular attention to progress through the later stages of action and maintenance. This second intervention will also reexamine preparers with counseling directed at changing both attitudes and behaviors.

Attitude and belief information was collected through the qualitative interviews as well as the structured questionnaire. This information was framed according to the theory of planned behavior as a means of examining beliefs, attitudes and intentions as precursors of activity behavior.

Although physical activity has been broadly defined as any body movement produced by skeletal muscles that results in a substantial increase over resting energy expenditure (Bouchard & Shephard, 1994), a more delimited exercise perspective of physical activity was adopted in the first study. Exercise refers to activity with specific external objectives such as improved fitness, performance, or health. It generally refers to repetitive activity performed at sufficient intensity, frequency and duration to produce such objectives (Caspersen, Powwell & Christenson, 1985). For the purpose of assessing stage of exercise behavior this research asked individuals to indicate their level of involvement in regular exercise. Regular exercise was defined as "participating in exercise three or more times per week for at least twenty minutes each time". As the qualitative research progressed a broader perspective of physical activity emerged.

Methods

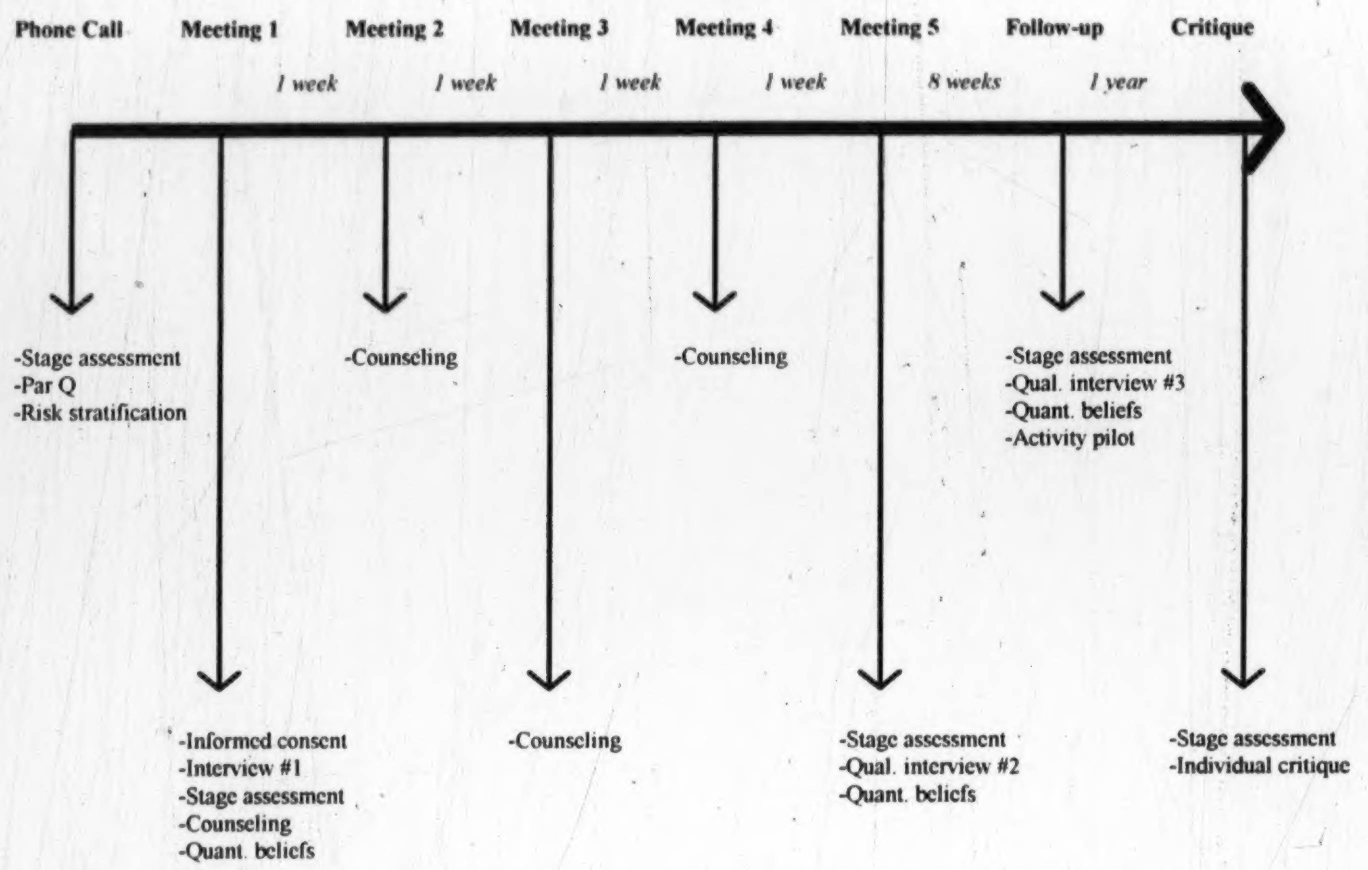
Overview

Data was gathered prior to, during and following the intervention used in study one. An overview and timeline for the measures, data gathering and intervention are provided in Figure 1.

Qualitative Data Gathering

This study utilized qualitative research methods, incorporating ethnographic interviewing and content analysis. A qualitative research approach emphasizes generating data rather than collecting it (Mason, 1996, chap.3). Three interviews were conducted to gain insight into behavior, attitudes, beliefs and stage of readiness. The interviews were conducted prior to initiating the intervention, immediately following it and eight weeks post intervention. Information provided by informants on counseling effects were summed from the three interviews with no comparison between interviews. The same process was followed for the advice provided by informants to

Figure 1
Timeline for Study One


Phone Call
Meeting 1
Meeting 2
Meeting 3
Meeting 4
Meeting 5
Follow-up
Critique
1 week
1 week
1 week
1 week
8 weeks
1 year
-Stage assessment
-Par Q
-Risk stratification
-Informed consent
-Interview #1
-Stage assessment
-Counseling
-Quant. beliefs
-Counseling
-Counseling
-Counseling
-Stage assessment
-Qual. interview #2
-Quant. beliefs
-Stage assessment
-Qual. interview #3
-Quant. beliefs
-Activity pilot
-Stage assessment
-Individual critique

help others to change their physical activity behavior. In contrast qualitative information concerning attitude and beliefs was assessed across the range of the three interviews. In this way change in beliefs were examined over time. Based on the theory of planned behavior (Ajzen; 1985, 1991), information was gathered pertaining to instrumental, affective, normative and control beliefs.

The methods used to qualitatively and quantitatively evaluate these beliefs relative to leisure behavior by Ajzen and Driver (1991, 1992), were applied to the investigation of beliefs relative to physical activity behavior. Informants were asked to discuss costs or losses and benefits or gains of physical activity as a qualitative measure of instrumental beliefs. Affective beliefs were investigated by asking about enjoyment and dislikes associated with physical activity. Control beliefs were addressed by asking informants to discuss factors that facilitated or interfered with their physical activity. A picture of normative beliefs was be obtained by asking informants to discuss those people who approved or disapproved of their participation in physical activity. Appendix B presents the actual questions posed to gather this information.

The qualitative interviews, in total, followed ethnographic techniques as described by Berg (1989, chap.2). The interview was semi-structured with the inclusion of a skeleton of questions to provide a standardized framework. A series of the questions was asked in their precise form. These were the essential questions. Additional questions supplemented the discussion. These questions were either pre-planned additional questions, or spontaneous probing questions intended to draw out a more complete story from informants. For a complete outline of the questions see Appendix A. This study generated data under several predetermined categories rather than searching without structure for raw data themes. Tapes of the interviews were transcribed. The data were coded and transferred to file cards for interpretation.

In addition to the purely qualitative methods, two measurement instruments were included in each interview. These measures provided collateral information to the qualitative inquiry. Stage of behavior adoption was determined by a rating by the individual, as suggested by Marcus, Rakowski and Rossi (1992). Attitudes and beliefs were assessed at three points using a short modified version of the Ajzen and Driver (1991) scale. These measures are discussed in the following section.

Eighteen months following completion of the final interview, each informant was asked to critique a focused review of the three interviews in which he participated (see Appendix H). The review concentrated on three areas: 1) the intervention effects, 2) attitudinal effects and 3) advice for others. The informants were asked to review the results and to note any discrepancies, omissions, or comments. They were also asked to note their degree of agreement with the review of these three areas of concentration. At the time of this follow-up the physical activity level of each informant was revisited with the stage of change questionnaire and descriptive questions about his current physical activity level. Revisiting each informant's activity level provided a snapshot of his long-term physical activity level.

Informants

Informants for this study were selected from the population of male faculty and staff members at a large western Canadian university. This sample frame was deemed appropriate as it was readily accessible and relatively easy to reach through established communication such as campus mail, e-mail and the telecommunications directory. As this was the initial application of this intervention the informants were recruited from a convenient population. Qualitative inquiry was facilitated by the investigator's familiarity with the population and the workplace. Purposeful sampling, following an initial screening by phone resulted in the selection of informants from each of the five stages of behavior change, but only informants in precontemplation, contemplation and preparation continued in study one. The conventional stages were used to generate a sample that represents the universe which was under study. A particular unit of the population represents a wider unit but does not truly represent the entire population (Mason, 1996, chap. 7).

Phone numbers were randomly selected from the University of Alberta Telecommunications Directory. Each phone call provided for informed consent, determined the stage of readiness and searched for volunteers in each of the three stages for continued participation. The proactive approach was used to contact possible informants. As Prochaska and Marcus (1994) suggest, proactive recruitment approaches are necessary to recruit precontemplators and contemplators. Telephone calls initiated contact searching for volunteer participants for inclusion in a four-week counseling program. The telephone interview determined the stage of readiness for physical activity behavior change. Informants were asked, following their stage classification, if they would be willing to participate in the counseling program. The calls continued until three informants were recruited for each of the precontemplation, contemplation and preparation stages of readiness. A review of the literature as well as common sense suggested that it would be difficult to recruit precontemplators. Individuals who are not considering exercise may be hesitant to participate in physical activity research. This assumption proved to be true. After nearly 200 calls only one precontemplator was identified who was willing to participate in the counseling intervention. Three contemplators and four preparers began the counseling sessions. Detailed information on each of the individual informants is provided in the results section of this paper. This detail serves to clarify the results of each informant and serves to facilitate discussion of how individuality affected the results of the intervention.

Intervention

The goal of this intervention was to provide flexible, effective fitness counseling to individuals in the early stages of physical activity behavior change. An individual clinical counseling intervention was chosen over options such as group, telephone, or computer-based interventions. The short-term counseling (Janis, 1983) and motivational interviewing (Miller & Rollnick 1992) models, the guiding theories for the intervention, seemed better facilitated through an individual approach. Motivational interviewing was used as a theoretical basis because of its strong consideration of stage theory and the application of practical counseling strategies. Although other theories deserve attention they were left to be considered in expanded interventions. They may hold promise as maintainers of motivational power.

This intervention was designed to alter beliefs, as well as to alter social and psychological factors facilitating influencing progress toward the initiation and eventual maintenance of physical activity. The development of stage specific actions was based on a review of clinical interventions and the theory regarding stage specific counseling (DiClemente, 1991; Marcus et al.,1992; Naylor & Simmonds, 1994; Naylor & Wheeler, 1995; Long, Wooten, Patrick, Calfas, Sharpe & Sallis, 1992; Rollnick et al., 1992; Squamish, 1990).

Each counseling intervention consisted of four sessions, the initial session involving the development of rapport and completion of an interview, questionnaires and forms. The development of rapport was accomplished by taking time to develop an atmosphere where self-disclosure was encouraged. A style of empathetic, warm and reflective listening was employed from the very beginning of the counseling process. Although the qualitative interview, the questionnaires and forms were part of the data gathering they also provided the counselor with an opportunity to learn more about the informant. This information opened up opportunities for discussion. Three sessions concentrated on the specific counseling needs of the individual with particular reference to his stage of change. The broad focus of sessions for precontemplators was to reduce resistance. For contemplators the focus was on analysis of costs and benefits. , For preparers the focus of the sessions was on establishment of commitment to action. These three sessions continued the development of motivating power and allowed the counselor to provide direction to the informants and provide positive feedback when appropriate. In this study the focus of the three sessions was on the use of counseling tools to help informants to make cognitive changes. These changes in attitude and beliefs were the objectives for informants in the three early stages of behavior change. The specific actions are outlined in Table 6.

Table 6

Session Concentration for Counseling

STAGE	*SESSION*	*ACTION*
Precontemplation	One	Establish rapport (J, M&R); complete interview, questionnaires & forms.
Precontemplation	Two	Review typical day, lifestyle & stresses; review effects of inactivity; asses 4 R's (P&D) (reluctance, rebellion, resignation & rationalization).
Precontemplation	Three	Increase awareness of physical activity pros (M&R, P&D), review pros & cons, prepare a personal list, reasons to stay sedentary or become active (M&R, P&D), address the 4 R's (P&D).
Precontemplation	Four	Encourage consideration of activity, strengthen personal benefits, reduce or get around barriers, provide choices (M&R, P&D).
Contemplation	One	Establish rapport (J, M&R); complete interview, questionnaires & forms.
Contemplation	Two	Complete decision balance (J), review the common barriers and benefits of physical activity (M&R, P&D).
Contemplation	Three	Attempt to increase intention to be active, identify supporters, reinforce benefits, rate confidence, provide information & incentives (M&R, P&D).
Contemplation	Four	Choose preferences and appropriate activities (M&R, P&D); develop specific personal plan, anticipate barriers (M&R, P&D).
Preparation	One	Establish rapport (J, M&R); complete interview, questionnaires & forms.
Preparation	Two	Provide further support for pros & benefits(M&R, P&D), review personal reasons to be active.
Preparation	Three	Attempt to strengthen commitment, anticipate barriers & develop coping skills, explore obstacles and their solutions (M&R, P&D).
Preparation	Four	Develop continued action plan, help client plan, set dates goals and objectives (J, M&R, P&D).

1. Key for Table: Major references for intervention components. J = Janis, 1983, M&R = Miller and Rollnick, 1991, P&D = Prochaska and DiClemente, 1984
2. Additional information for counseling specific to each stage of change is contained in Appendix F.

Measures

Prior to their involvement each informant was asked to complete informed consent for their participation in the study. (see Appendix C). Risk stratification of each informant was completed to purposefully select only apparently healthy males (ACSM, 1991, p. 5-10) between 35 and 55 years of age. During the initial telephone interview, stage of change was assessed by asking each informant to rate his current exercise behavior as estimated by one of five statements (Marcus, Rakowski and Rossi, 1992). The five rating statements are provided in Table 7. Informants were asked to "please indicate which statement best represents your current exercise behavior". Regular exercise was defined as participating three times per week for at least twenty minutes.

Table 7

Stage of Change Classification

Stage	***Statement***
Precontemplation	"I currently do not exercise and I do not intend to start exercising in the next six months."
Contemplation	"I currently do not exercise but am thinking about starting exercising in the next six months."
Preparation	"I currently exercise some but not regularly."
Action	"I currently exercise regularly, but I have only begun doing so within the last six months."
Maintenance	"I currently exercise regularly and have done so for longer than six months."

To supplement the qualitative assessment of beliefs and attitudes a number of semantic differential scales were administered, at each of three interviews, to provide measures of beliefs and attitudes. Two sets of two-item, seven-point semantic differential scales assessed subjective norm and perceived control. A five-item scale assessed instrumental attitudes, while a six- item scale assessed affective attitudes. A copy of these scales is presented in Appendix B. This method was reported to be highly reliable for both between and within-subject analyses (Ajzen & Driver, 1991, 1992; Ajzen, Nichols & Driver, 1995).

Analysis

The derived data were read in an interpretive fashion rather than in a literal or reflexive fashion. This means that the counselor/researcher constructed a version of what the data meant or represented. This construction led to a number of interpretations of the data. Links were made between theory and practice using reasoning which allowed movement between everyday concepts, lay accounts and social science explanations (Mason, 1996, chap. 7). Rather than being limited by deductive or inductive reasoning the researcher made connections between an informant's interpretations and social science interpretations provided by established theories. The reasoning suggests that theory, data analysis and data gathering are produced dialectically. For example information from theories and models was applied but modified based on comments from the informants. This form of reasoning allows for discussion of the observations based on both the explanatory models and underlying mechanisms.

The effectiveness of the intervention was rated based on the reports of the informants and the interpretations of the counselor. These interpretations are supported by the rigor of the qualitative methods used rather than the control of an experimental design. The effectiveness was based on clinical interpretations not a demonstrated cause and effect relationship. The raw data obtained from each of the informant's responses to open-ended questions were transcribed, from cassette to computer files. The tapes were reviewed and compared to the transcription to ensure accuracy. Content analysis of the interviews was conducted. The transcripts were reviewed to highlight the critical points from each paragraph. This summary of transcripts was transferred to file cards to allow for ease of sorting themes from the three interviews. Themes were analyzed to interpret data in terms of change in beliefs, as well as for similarities and differences. A data summary was constructed for each informant from the file cards. At this point further interpretations were made based upon a review of each of the re-constructed themes. Raw data themes were identified from specific participant responses, including attitudinal changes, changes to physical activity behavior and to behaviors related to progress through the stages. The raw themes were organized into interpretable and meaningful themes (Heck & Kimiecik, 1993). The validity of themes was supported by confirmation with the informants 18 months following the intervention. The post-interview critique provided this information. The stage and belief measures were compared and contrasted with the qualitative interpretations.

Results

Introduction

Since this study was based on the premise that previous interventions have been limited by a lack of flexibility in their design and a lack of attention to individual differences, individual results are crucial to the integrity of this study. The results that follow include a summary of each informant's individual data. Results include data on changes in the stage classification and changes in beliefs across the range of the study. Information was also provided from the informants on how others similar to them could go about changing their physical activity behavior. Individual results provide perceptions on the effectiveness of the intervention and suggestions for improvement. Finally a critique of the individual findings was included for each informant in the study. Following the individual results, group results are presented which identify similarities and differences between individuals in each of the three stages. This will provide the basis for discussion of individual and stage applications of a counseling intervention directed at promoting regular physical activity for the long term.

Review of Individual Informant Data

Informant PC1 (Precontemplation)

Description

This informant was a 44 year old male employed by the University of Alberta as a technical advisor. The informant has achieved a masters degree during post secondary education. Although the Par-Q assessment noted a childhood heart murmur, the informant reported that his physician indicated it would not be aggravated by physical activity. This informant reported no medical reasons why physical exercise should not be undertaken without consultation with his physician.

Stage of Change Classification

During the initial telephone contact this informant stated that he currently did not exercise and did not intend to start exercising in the next six months. This classified the informant as a precontemplator not considering physical activity behavior change.

Reported Intervention Effects

This informant moved from a classification of precontemplation to a classification of contemplation, indicating that he was giving serious consideration to participating in activity regularly. He indicated that he recognized changes in attitude but not in behavior, although he was generally more active and had experimented with regular activity for a ten-day stretch during the eight-week post-intervention period. His comments on the effects of the intervention were that it raised his awareness of physical activity and educated him on the benefits that could be achieved through regular physical activity. He recalled past experiences during the intervention and recognized the difficulties and successes of previous change efforts. He was able to accept the logical relationship between physical activity and health. He was reminded during the intervention of the long-term benefits physical activity has on health and wellness with increasing age. The informant appreciated the "soft sell" approach to counseling.

Suggestions for Improving the Intervention

This informant suggested that adding an experimental period of activity was useful to him and could be a useful addition to the counseling protocol. He suggested that more structured material and a rating of his physical activity, health and fitness compared to others his age could be useful additions for other individuals in his stage. The informant felt that the length of the intervention could be reduced to make the program a more realistic alternative for the population. The informant believed that reviewing the benefits and proving that physical activity was necessary for him would be an aid to him changing his behavior. Good weather would increase the likelihood of him increasing activity. He felt that changing behavior in the winter was unlikely. In short he needed a reason to strive for personal achievement, to plan activity and to set goals.

Reported Attitude and Belief Effects

Instrumental attitude.

Attitudes were different following the intervention. Instrumentally the costs such as scheduling, injury risk and time pressure, were increased following the intervention, but by the time of the follow up the costs were recognized not to be barriers to physical activity. The only remaining cost was the physical discomfort and stiffness resultant from physical activity. This informant had a great increase in the perceived benefits of physical activity. There was a shift from health related benefits alone to positive feelings, mental and cognitive changes.

Affective attitude.

The affective attitudes of this informant did not demonstrate much change effects. The informant reported increased enjoyment following the intervention but it dropped off by the eight-week follow-up. Dislikes were reduced then maintained following the intervention. The informant perceived no great negatives. The use of time and energy which was reported as an initial dislike was a less significant problem than reported earlier in the study.

Control beliefs.

In this informant, the control beliefs demonstrated a shift from external facilitators and obstacles toward more internal factors. This shift suggested that this informant was gaining a sense of control over his activity situation. Following the intervention, the informant reported a shift to internal facilitators, recognizing the need for his own attention rather than external motivation. During the second and third interviews this informant addressed his internal rationalizations and perceived barriers as the major obstacles to his changing activity behavior. The reported changes in these two categories indicate an increase in perceived control in this informant

Normative beliefs.

In terms of the normative beliefs, this informant did not report significant alterations in his perception toward social encouragement or discouragement.

Report of Individual or Situational Influences

Throughout the duration of the study this informant reported that his barriers to changing activity behavior were internal. The problem was one of personal inertia not a lack of opportunity.

Reported Advice for Others

According to this informant, precontemplators should be educated on the benefits of physical activity. These include the cognitive effects, the long term effects of activity and the effects on quality of life. He emphasized the importance of finding activity that could be done in a social setting or with an exercise partner. The best method to influence others in his opinion was by providing an example rather than preaching to them. Other suggestions were to find activities that required little skill and to assess what was holding the individual back from making changes in lifestyle.

Informant's Independent Critique

This informant in follow-up reported participating in physical activity regularly when the weather allowed him to cycle. During the remainder of the year he participated in physical activity less regularly. He cycled to and from work for six months in the summer of 1997. Since that time he had been playing squash. This informant planed to cycle as the season permitted and to continue his squash. This informant agreed with the summarized interpretations of his transcribed interviews. He did not report any discrepancies, omissions, or additions with regard to the intervention, his attitudes or his advice for others who need to habitualize their physical activity.

Informant C1(Contemplation)

Description

The informant was a 43 year old male employed as an academic staff member, by the University of Alberta. Employment includes work as a research associate and a sessional lecturer. The informant has completed post-secondary education achieving the level of Ph.D. This informant reported no medical reasons why physical exercise should not be undertaken without consultation with his physician.

Stage of Change Classification

During the initial telephone contact this informant stated that he currently did not exercise, but was thinking about starting exercising in the next six months. This classified the informant in the contemplation stage of readiness for making physical activity behavior change.

Reported Intervention Effects

This informant had been active in his distant past. Both in school and at university he had participated in team and competitive sport. It had been 15 years since he had been involved in regular activity other than walking. During the intervention he solidified his belief in the positive effects of walking. He had maintained some level of fitness by regular walking and by not smoking. This informant made no change on the stage of change questionnaire. He stated that he was much more active than before the intervention, but not in terms of strict exercise. In terms of strict exercise he suggested that he could mark his questionnaire halfway to preparation but he was still working on it. He was participating in purposeful walking and living actively. He was making an effort to walk instead of drive, walk at lunch and after dinner, park further from destinations and climb stairs. He appreciated learning about the contribution that activity which was not strict exercise, could make to his life. He commented that the intervention had helped, but he was still unsure how much. The degree of help would not be determined until he had achieved the level of activity he was hoping to reach. The technical details on health benefits were useful to this informant. He appreciated the confirmation of his current activities and felt that his best opportunity to increase his exercise was by extending his participation in current activities. Change was in the back of this informant's mind prior to the intervention but he had never done anything about it. He felt halfway to preparation suggesting that he had taken several behavioral steps to change including securing equipment and making definite plans to get active. The informant reported that he was now much more active and committed to doing more physical activity. The intervention encouraged this informant to make lifestyle changes. It provided education and confirmed his beliefs in the benefits of walking. The program provided specifics on how to go about changing his activity behavior.

Suggestions for Improving the Intervention

This informant suggested that the intervention could be better organized and could reduce overlap. This was not recognized as a major problem, but fine tuning would be advised. To aid this informant with an intervention he suggested that he needed information on starting a program without overdoing it, buying equipment and addressing concerns about signing up and committing to a program.

Reported Attitude and Belief Effects

Instrumental attitudes.

Prior to and following the intervention this informant reported that time for initiating and participating in activity was the single cost he connected to physical activity. At the time of the follow-up interview he stated that time involvement was no longer a cost. Throughout the study health related changes were consistently reported as benefits. Following the intervention, in addition to the physical health benefits, feeling better was reported as an additional benefit.

Affective attitudes.

Prior to the intervention this informant expressed his enjoyment of competitive activity. Following the intervention and during the follow-up the informant expressed an intrinsic enjoyment of physical activity discussing the fact that when he was active he enjoyed feeling better. He enjoyed the anticipation prior to physical activity and the relaxation afterwards. These intrinsic factors increased as the study progressed. Originally the informant reported disliking the preparation and wind-up of physical activity. These were not reported as dislikes during the follow-up interview and in fact were reported as times of enjoyment.

Control beliefs.

There was a distinct shift from external facilitation to internal facilitation of physical activity behavior. Originally he stated that his activity would be facilitated by being part of activity and by doing competitive, social activity. As the study progressed he shifted towards more internal facilitators, taking control of his behavior. He was taking steps to become active such as finding active friends and changing his priorities and focus. Initially this informant reported that his barriers to physical activity behavior were his lack of knowledge and motivation. As the study progressed his perceived barriers became more specific. Following the intervention he indicated that his major barrier was setting priorities to facilitate physical activity. He recognized that he would need to work on internal blocks to prioritizing physical activity.

Normative beliefs.

This informant reported that he was surrounded by active people at work but did not feel comfortable discussing his desire to become more active with them. He stated after the interview that he would like to get active first before discussing it with friends. During the follow-up interview he indicated that he had made a new friend who was active, felt that this encouraged his physical activity. For a period he felt that his family would be encouraging his physical activity. Throughout the study the informant did not express discouragement from others but did seem hesitant to discuss his physical activity with others.

Reported Individual or Situational Influences

Originally the informant could not decide if his activity behavior was primarily hampered by individual or situational factors. Immediately following the intervention he felt that individual factors were the primary influence on his behavior. At the time of the follow-up he reported that both individual and situational factors played a role in influencing his physical activity behavior. He needed to make the decision to do something consistently, but also needed to find the right situation.

Reported Advice for Others

Initially this informant hesitated to make suggestions to others but on the second and third interview he promoted the benefits of living actively. He suggested that people should walk whenever possible. He felt that it was important to provide a positive example to those less active. He felt that it was best to wait for the individual to express interest or ask for advice. He believed that the first step in many cases is to promote active living. Using activity as a substitute for the automobile was one of his suggestions. This informant did not see negatives in the intervention, but suggested that the program could be streamlined with additional information added to supplement the existing intervention. The informant had taken initial steps to facilitate physical activity such as purchasing sport runners and activity clothing. The informant had begun a relationship that encouraged his physical activity.

Informant's Independent Critique

This informant reported during the critique that he was currently classified in preparation. He walked, cycled and was playing badminton. He was definitely more active than prior to the intervention. Following the intervention he valued physical activity more and this was reinforced by the fact he was involved in a long-term relationship with someone who wanted him to keep healthy. He strongly agreed with the interpretation of intervention effects, suggestions for improving the intervention, instrumental attitudes, affective attitudes, individual or situational influences and advice for others. He agreed with the interpretations of control and normative beliefs. At the time of the eight-week follow-up this informant was in a new relationship which encouraged his participation in physical activity. Eighteen months later, during the independent critique, he noted that his involvement in a long-term relationship was even more supportive of his continued physical activity.

Informant C2 (Contemplation)

Description

This informant was a 38 year old male employed at the University of Alberta. He described his position as a staff position and his highest education level as a post-secondary diploma. His job includes a mix of administration, manual labor and driving. The Par-Q assessment identified some knee problems but no recommendation by his physician that these would be aggravated by physical activity. This informant reported no medical reasons why physical exercise should not be undertaken without consultation with his physician.

Stage of Change Classification

During the initial telephone contact this informant stated that he currently exercised some but not regularly. At the beginning of the first meeting he asked on his own initiative to change his classification. At that time he stated that he currently did not exercise, but was thinking about starting exercising in the next six months. This classified the informant in the contemplation stage of readiness for making physical activity behavior change.

Reported Intervention Effects

This informant had a job that included sedentary desk work, driving, operating heavy equipment and lifting. He recognized that his job did not provide enough regular activity to satisfy his desire for fitness. This informant moved to the stage of action from contemplation following the intervention and was still in action when he completed a questionnaire during his eight-week probe interview. He said that the recruiting phone call came just as he was thinking of making a call to get information about exercise programs on campus. The informant reported that the intervention was very helpful. It confirmed a lot of the things he was thinking regarding physical activity. The intervention's focus on benefits was helpful. He initially was expecting instruction on what he should do to get active, but realized that he was not initially ready for behavior change. The focus on changing his attitude matched his needs. During the third interview he felt he was now at the point where fine tuning his behavior change was appropriate. The opportunity to work on what was important to him at his own pace was seen as an effective approach. The counseling approach allowed him to learn how to motivate himself. He was very pleased to lose 13 pounds following the intervention prior to the eight-week follow-up. The intervention put into words many of the thoughts he had been considering. He had recognized a falling activity level and was developing a desire to become more active. He had taken several behavioral steps including getting several pieces of needed equipment and beginning a morning muscular fitness routine.

Suggestions for Improving the Intervention

This informant indicated that a number of things would aid him to continue his change. Continued counselor contact would help to maintain his motivation. Other things that helped his motivation were his fear of gaining weight and experiencing health problems. He felt that his next step to solidify behavior change was to make physical activity a regular part of his daily routine. To make the program more effective he felt that information could be focused on the specific activities he had chosen. Further information could be provided to help him with self-motivation. He acknowledged his stage movement but expressed the readiness for continued counseling as he progressed through the next stages. He did not suggest any things that should be removed from the intervention.

Reported Attitude and Belief Effects

Instrumental attitudes.

Initially this informant reported that time was the primary cost. Although it was mentioned again during the second interview it was devalued. Finally the informant reported that there were no real costs to becoming physically active only benefits. This belief was reiterated more strongly during the final interview. During the duration of the study this informant shifted from expressing what he suspected to be beliefs to expressing benefits he had actually experienced. There was also a shift toward more intrinsic benefits such as positive attitudes and feelings. He noted changes in his physique and a significant weight loss. He experienced cognitive effects and positive influences on other lifestyle behaviors such as his nutritional practices.

Affective attitudes.

During the initial interview this informant reported the environment and possible socialization as things he enjoyed as part of physical activity. As the intervention was completed he repeated these enjoyable factors but added several more including some of the benefits he had received from his increased activity. He also enjoyed discovering new things and the anticipation of good things he expected to receive from increasing his physical activity. During the initial interview the informant reported that he disliked the boredom of running indoors. No dislikes were reported on the post-intervention or follow-up interviews.

Control beliefs.

There was a shift in this informant's facilitators as the study progressed. He initially had general facilitators such as changing his attitude about scheduling activity into his busy day. As the study progressed he reported more specific facilitators such as finding a workout partner, looking for two specific workout times, starting moderate activity and then making it more vigorous and planning to play badminton or racquetball. More detail was provided by this informant about barriers as the study progressed. Time remained as the major barrier for this informant.

Normative beliefs.

This informant expressed concern about how others viewed him and about relationships in his past. He stated that physical activity with his family and friends was very important to him. He had had significant support from a friend to establish an interest in cross-country skiing. During the follow-up interview he reported that he was searching for additional social support, specifically for an exercise partner to work at intensities higher than he could reach with his family. He consistently reported that he did not perceive social discouragement, but following the intervention he added that he would consider the source of discouragement and would disregard much of it.

Reported Internal or Situational Influences

Initially this informant suggested that changes in the situation were most influential in influencing his attitude. Following the intervention the informant recognized the importance of individual factors in motivating him to become more physically active. It was reported during the follow-up interview that this informant recognized the role of both situational and individual influences. He recognized his role in taking control of the situation to fulfill his individual plans.

Reported Advice for Others

This informant advised that the first thing that people should do is to focus on the benefits of physical activity and becoming informed about physical activity. Others should search out a counselor or an active individual to act as a model. As the intervention ended he focused on the importance of working on attitude prior to attempting to make changes in behavior. He highlighted the importance of focusing on benefits important to the individual, as well as on their attitude towards physical activity. These were seen as precursors to physical activity, making the behavior change easier.

Informant's Independent Critique

This informant reported being in the stage of preparation during the critique. He reported being slightly more active than prior to the intervention. He was using stairs rather than elevators, going for a 30 to 40 minute walk once a week and doing heavy work once a week clearing fallen trees and splitting wood. He had been consistently stretching daily to begin his day. The informant indicated that he now understood and valued physical activity, but still finds motivation to be lacking. He strongly agreed with the interpretation of normative beliefs, individual and situational influences. He agreed with all the additional categories with no report of discrepancies, omissions, or additions to the interpretation. It was important to add some major changes in this informant's social support system. This informant had gone through a difficult marital breakdown and separation. In discussion with this informant it was evident to the counselor that the marital breakdown has been difficult for the informant and has adversely influenced many aspects of his life, including his physical activity. Although he did not reflect on the changes in his lifestyle it was evident that this informant had gone through stressful changes in his lifestyle since the follow-up interview.

Informant C3 (Contemplation)

Description

This informant was a 49 year old male faculty member of the university. He worked as a faculty member and within a national health organization housed on the university campus. The informant completed a Par-Q evaluation reporting no reasons not to engage in physical activity without medical supervision. Some tendonitis was reported in the right arm.

Stage of Change Classification

During the telephone interview the informant stated that he did not currently exercise but was thinking about starting to exercise in the next six months. This placed the informant in the contemplation category.

Reported Intervention Effects

This informant moved from contemplation into preparation following the intervention. He reported being in preparation again during the eight-week follow-up interview. He stated that the intervention nudged him past energy barriers that were holding him in contemplation. The informant stated that the intervention had a great impact on him. He stated several times that he was telling others about the program. One decision that demonstrated the program's effect was the informant's decision to purchase a treadmill. The intervention brought the idea of physical activity into the mind of this informant. He felt some pressure to think about the discussion prior to the next meetings but did not feel pressure from the counselor to make changes. He put pressure on himself to make changes. The intervention allowed him to make decisions and to consider what he wanted from the program. He decided what was achievable and then looked at barriers and goals. It was easier to break barriers into bits and then deal with them. Overall he felt the program was well focused. He liked the subtle approach, but suggested that some individuals might need a "harder hitting approach" to dislodge them and get them into physical activity. He felt that many individuals paid attention to others' health but little attention to their own. He had talked to others about the intervention because he believed in the approach taken to change attitudes so that changes in behavior could follow. This informant had taken several decisions into his own hands by the time of the follow-up intervention. He had considered what he wanted to do and why he was not doing it. He had made a conscious decision to stop his downward trend in physical activity. He believed that the intervention worked because it used a self-directed approach to change, questioning the individual's desires and motivations to construct reasonable expectations. It helped match activities to objectives and it identified barriers and broke them down into manageable bits. He believed that the intervention could be applied to other behavior changes because behavior change was likely to follow attitude change.

Suggestions for Improving the Intervention

To continue making positive stage changes this informant suggested that he would find it helpful if the intervention would help enable him to make connections between physical activity and other aspects of his life. He believed he would benefit from assistance to find activities that were enjoyable but have few negative consequences. No reductions in the intervention were suggested by this informant. He felt the intervention was well focused. It was suggested that for those who were particularly concerned about their personal or family health the focus should be on health effects and benefits. Such a focus should not be emphasized in general for this intervention.

Reported Attitude and Belief Effects

Instrumental attitudes.

Limited detail was provided by this informant on the perceived costs of physical activity on the initial interview. During the follow-up interview the discussion of costs was expanded. Time was the major cost associated with physical activity. It was recognized that making time was just a matter of priorities. The informant concluded that time spent in physical activity was often time taken from unwanted or unproductive activities. This informant came into the study with a good understanding of the benefits of physical activity, including the intrinsic benefits, physical benefits and psychological benefits. This informant experienced an increase in the social benefits. He reported many benefits to his family interactions and to the social support within his family. The intervention seemed to have a positive effect on both the informant and his family.

Affective attitudes.

This informant began the study with a number of perceived enjoyments. Much of this enjoyment came from intrinsic sources, such as his personal sense of accomplishment. He maintained this sense of enjoyment throughout the study. The informant reported nothing he disliked about physical activity during his initial interview. Following the intervention he had given some thought to factors he disliked that were associated with physical activity. He came to the realization that he had some dislikes, mainly associated to winter weather and problems with self-motivation.

Control beliefs.

The facilitators of physical activity initially reported by this informant were mainly intrinsic factors such as feelings of well-being and feeling good. He made some mention of the importance of social support at that time. During the follow-up interview he placed great value on the social support he was receiving from a more active family and from active friends. This social support had become critical to his success. Barriers reported during the initial interview included physical injuries, fatigue, scheduling, time constraints and a lack of cultural support. By the time of the follow-up interview he had reduced his perception of barriers. He stated that there were no barriers now except the need to set priorities and to do it for himself.

Normative beliefs.

This informant recognized a general sense of support from people around him when he entered the study. He had a history of doing a lot of activity with his family in the past but this activity had dwindled in recent years. During the follow-up interview he perceived a strong sense of social support. His family was functioning as a unit to support each others' physical activity. The informant perceived social discouragement related to the demands of his work. In his initial interview he felt the workplace did not provide a structure that facilitated his physical activity. In the follow-up interview he stated that he no longer found much discouragement. There was no longer any social discouragement which he perceived as important.

Reported Individual or Situational Influences

This informant began the study with a primarily situational perception of the factors that influenced his physical activity behavior. As the study progressed he shifted to more of an individual focus. Because he had a supportive environment he felt his major focus now was to overcome individual barriers leading to a prioritization of physical activity in his schedule. In general he felt it was necessary to overcome the individual barriers before getting to the situational barriers.

Reported Advice for Others

This informant believed that it is difficult for people to change their behavior if they have not made up their minds to do so. To change attitude one needs to find something gratifying. This informant greatly expanded his advice for others following the intervention. He stressed that changing physical activity behavior is not as easy as it might appear. He felt that scheduled counseling sessions were very helpful. The sessions aided one in considering what one really wanted and helped to determine what stood as barriers to achieving objectives. He controlled his own fate by being allowed to pressure himself to determine and meet his objectives. He suggested that people search for an environment that serves to support their changes.

Informant's Independent Critique

This informant reported being in the stage of preparation at the time of the critique. He was now using stairs rather than elevators, was walking more and had incorporated hiking as a regular recreational activity. He participated occasionally in treadmill walking and stationary cycling. At that time he indicated that he was somewhat more active than prior to the intervention. He reported being more aware of opportunities for physical activity in his daily life. This informant agreed with all paragraphs as interpreted. To improve the intervention, he suggested that it could direct more attention to the promotion of physical activity as a means of improving self-esteem and self-concept. He commented that social support for him was more of a reinforcing factor than a critical factor for his success. This tempered the value of social support as a facilitator for his physical activity.

Informant P1 (Preparation)

Description

This informant was a 55 year old male faculty member of the university. In his completed Par-Q questionnaire, the informant indicated one area of concern was his lower back. He has serious chronic lower back pain, but he has his doctor's support to participate in as much physical activity as his limitations allow. He has a good understanding of the types of activities that aggravate his back pain.

Stage of Change Classification

On the initial telephone interview this informant stated that he was currently exercising but not regularly. This report placed the informant in the stage of preparation for regular physical activity behavior.

Reported Intervention Effects

This informant has experienced a decline in physical activity since having back surgery in 1986. This informant regressed following the intervention reporting, that he currently was not exercising but was thinking about exercising in the next six months.

This was contrary to his statement during interviews that he had never been in a phase when he was not exercising. Generally he felt that his physical activity was declining with time. In his opinion, his maturity reduced his need to exercise as he aged. This informant suggested several times during interviews that he did not believe that verbal interventions were effective in changing behaviors. He contended that people changed only when they had to or they were highly rewarded for doing it for instance only if you paid them or they were forced to change. He had a strong belief in dealing with behavior only. The informant did not see a negative or a strong positive value for physical activity. He viewed physical activity only as a preventive influence to reduce negative aspects of health. This informant stated that the counseling made little difference to his behavior. He continued to suggest that the program had added to his desire to become more active. He suggested that the effectiveness of a counseling program such as this was dependent on selection of informants who were motivated to change. The program could not be individualized for him because the counselor had no leverage to initiate change and no punishment system. In a positive light he felt the program's warm, honest and straightforward approach was appropriate. The informant stated that the information on equipment and methods of being active without irritating his back would be something he would use in the future. The informant had indefinite plans to make some changes. He needed additional work to be convinced of the benefits of regular physical activity and to develop a personal commitment.

Suggestions for Improving the Intervention

The major concern for this informant was his back problem. To adapt the program for him it would be useful to find exercises that he could do without aggravating his back pain. Although he did not directly state that more effort could be directed at working specifically with his back pain, it seems that this informant could have benefited from working with a counselor with more expertise working with back pain problems. The program would have to be tailored to spend more time evaluating activities to improve fitness without exacerbating his back condition. If the informant was advised by his physician that his health was poor and could be improved by physical activity it would help to provide motivation. Working as a member of a medical team would be one way to approach some clients. A counseling program such as this could be improved if there was a punishment or reward system established. A counseling program would be most effective if clients who were motivated were selected to receive the program. This informant did not feel motivated. He felt that at his age he was more likely to participate in less active leisure. This informant had a strong belief that verbal interventions were not especially effective at changing behavior. He would suggest changing the intervention to remove the verbal aspects of the intervention.

Reported Attitude and Belief Effects

Instrumental attitudes.

This informant did not see a lot of costs associated with physical activity. The only cost associated for him was the risk of aggravating his back problem. This had been a concern for some time and did not seem to be affected by the intervention. His view of costs did not change during the period of the study. During the initial interview this informant listed physical, social and cognitive changes he viewed as benefits of physical activity. A more negative perspective was expressed during the follow-up interview. At that time the informant said he did not see an upside to participating in physical activity. He viewed physical activity only as a way to prevent the downside of inactivity.

Affective attitudes.

This informant reported more things he liked during the follow-up interview. He enjoyed the feeling of being physically tired. His major source of enjoyment was gained from athletics. He did not consider sports such as basketball to be exercise. In general this informant indicated that his enjoyment of physical activity was decreasing as years went by. He said that he was finding less and less he enjoyed about physical activity. The number of dislikes he reported and the depth of the discussion of dislikes increased as the study progressed. He did not enjoy preparing for physical activity. He enjoyed games, but found activities such as biking or weight training to be tedious. He had negative feelings toward older people who exercised. He said their behavior was good but their motivations were often neurotic or unadmirable. He felt that exercise was not a strange behavior but many strange people engage in it!

Control beliefs

Facilitators during the first interview included being invited to participate in social activity, swimming and pain free activity. A large degree of control was not exhibited. The informant stated that things would be much different if he was pain free. Many of the facilitators were external to his control. In the follow-up interview the informant indicated that he did have access to facilities and the time to be physically active. He was more active when swimming with his grandchildren. He stated that he may have to be paid to become physically active. During the initial interview this informant suggested that the only real barrier to physical activity for him was his back pain. Reducing physical activity relieved his pain. During the follow-up interview this informant listed several barriers to his physical activity. The list included: his lethargy and lack of interest in physical activity, the difficulties he experienced preparing for physical activity and the fact that he was in excellent health but not in athletic terms. This informant might benefit from counseling on the long term effects of inactivity and education about the health related aspects of physical activity. He may lack motivation because the forms of physical activity that he enjoyed also increased his back pain.

Normative beliefs.

This informant indicated during his initial interview that he was encouraged by everyone to exercise more. He expanded his discussion during the follow-up interview. He indicated that the majority of his support came from his wife with little support from others. The support he received from his wife was mixed because she was negatively affected if his physical activity led to increased back pain. His comments suggested some inconsistencies in the degree of support he received from others. The informant consistently reported that there was no social discouragement throughout the study period. He reported no discouragement other than his physician's advice to refrain from physical activities that irritated his back.

Reported Individual or Situational Influences

This individual indicated during the initial interview that the only aspect that counseling could deal with was behavior. During the follow-up he stated that the majority of his barriers to physical activity were individual. He stated that his ambivalence and lethargy kept him from being more active. The informant had been in rehabilitation for his back for 15 years. He found the rehabilitation tedious and was uncertain about the relative value of exercise.

Reported Advice to Others

This informant suggested that others participate in physical activity within a team or social context. Rather than exercising in isolation he suggested that individuals find someone experienced with physical activity. Try what they do. He said individuals should find an activity they enjoy. If one cannot take up physical activity try to ensure that other lifestyle activities are under control. He suggested some simple things such as walking more, swimming more, spending time with active children. Spending time with active people is likely to lead to activity. Because he does not believe in the inherent value of physical activity he would not suggest activity to less active individuals unless they expressed a strong desire or asked for his advice.

Informant's Independent Critique

At the end of this study this informant classified himself as a precontemplator. This continued a trend uncovered during the interview process. He was in the process of sliding toward precontemplation along the stage of change continuum. He indicated that he was less active than prior to the intervention. He reported no change in the value he placed on physical activity, but was integrating physical activity less into his life.

Informant P2 (Preparation)

Description

This 52 year old male was an administrator at the university. He completed the Par-Q evaluation with no report of reasons why physical activity would not be recommended without medical supervision.

Stage of Change Classification

This informant indicated that he exercised some but not regularly. This statement classified the informant in preparation for becoming physically active.

Reported Intervention Effects

This informant classified himself in preparation to make behavior change on the stage of change questionnaire throughout the length of the study. He stated that changes had occurred in his attitudes and related behaviors such as reading about lifestyle issues and participating in more moderate activity. He honestly classified himself still being in preparation stating that he occasionally missed activity and felt that he should have gone out. He felt that he became more aware of benefits such as effects of physical activity on cholesterol levels. His change in attitude has included "finding a motivational hook", believing that physical activity must be part of his long-term perspective. Physical activity will be part of his retirement plan. He suggested that many people should think of the long-term benefits of physical activity. He felt that he did not have a negative attitude toward physical activity, but at times felt "lukewarm" towards it. Later he continued to feel that external motivations were important but was working to translate changes in attitude into changes in behavior by developing a self-motivation strategy. This informant felt that the program was beneficial. It provided tips and suggestions to evaluate physical activity. The logging of physical activity would help this informant to set goals and chart his progress toward them. Another way the counseling helped was by exploring the types of physical activity that would fit with his lifestyle. The informant believed that the counselor's presence served to motivate him. The informant emphasized that he felt it was as difficult for him to change his behavior as it would be for a person in precontemplation. He felt that he was neither in nor out of physical activity which made further change difficult. The counseling helped this informant realize that he had to work on it more to make more change. He saw a great value to moderate physical activity. He realized the value that physical activity could play in his future. He made the decision to enhance his belief in the importance of health. He planned to do this by reading more about physical activity and to make plans to take up physical activity as insurance for his future wellness. This informant's statement that external motivations were critical to his continued motivation indicated that the informant could benefit from a continued counseling intervention. During the critique he highlighted his need to move toward greater intrinsic motivation in order to increase his level of activity and integrate it into his lifestyle.

Suggestions for Improving the Intervention

The informant suggested that the program could be more effective if support materials were provided, an overview was provided to the clients and a physical assessment was included in the program. Counseling could be reviewed on video or through readings or handouts. A list of activities with corresponding pros and cons would help informants to choose activities that suit them. This informant suggested removing some of the open-ended questioning and replacing it with some more informant specific counseling. This informant indicated that he could continue to move towards activity if he was able to translate his changes in attitude into changes in behavior. He felt that external motivations were still important to him. The counseling could provide more external motivation to him. A reminder system would help to keep him motivated. During the individual critique this informant added another suggestion, that the intervention examine other areas which might impact on the intervention. By this he meant that the counseling should be placed in context, taking a holistic approach.

Reported Attitude and Belief Effects

Instrumental attitudes.

This informant seemed to develop a more realistic picture of the personal costs of physical activity following the intervention. Initially He saw only time as a cost. Following the intervention he expressed that many physical activities were boring for him and exercise was not a high priority. The next step for an informant at this stage might be to find ways to reduce this cost and to make physical activity more of a priority. This informant came to recognize more benefits associated with moderate physical activity as the study progressed. Following the intervention he recognized that exercise did not have to be vigorous to have benefits and he was more likely to find it possible to do moderate activity. This informant would benefit from counseling to recognize more personal benefits of regular physical activity. During the critique he confirmed the importance of continued counseling and monitoring to highlight the benefits of regular physical activity and to help him stay on course.

Affective attitudes.

Following the intervention this informant indicated that he enjoyed activities that could be done outside or in other pleasant environments. He did not enjoy physical activity done in the basement, or on exercise machines. There was little change in his enjoyment of physical activity following the intervention. This informant might benefit from experimentation with structured classes he found interesting and stimulating. Counseling could help him explore additional ways to increase his opportunities to participate in outdoor activities.

Control beliefs.

Following the intervention this informant set a goal to lower his cholesterol through a combination of nutritional and physical activity behavior change. He felt that physical activity as part of a lifestyle program would serve to facilitate his activity. His career in health care became a facilitator because he valued health and recognized its importance. He had a deep interest in health. Originally this informant suggested that time management was the only real barrier to his physical activity. Following the intervention the informant had given serious thought to changing his activity behavior. He recognized that he needed to find something he enjoyed and activities that could serve as alternatives to activity outside in the winter months. He felt that he had reduced his perceived barriers to physical activity by the end of the follow-up. In his critique comments he suggested that his barriers were not due to health restrictions or physical limitations, rather barriers were only motivational issues.

Normative beliefs.

This informant expressed that he had support for changes in his physical activity. Prior to the intervention and following it he expressed that he was supported by his spouse to become more physically active. Following the intervention he expressed the importance of his wife providing external motivation for him to increase his physical activity behavior. He noted during the follow-up that although his wife provided support, at times her influence had negative aspects. Her motivation was not always positive and at times discouraged his activity. He did not openly express much concern about social discouragement during the study. Upon reflection during the critique he indicated that it really did not hamper his motivation. In reality he acknowledged that self-discipline was essential for him to maintain a level of physical activity.

Reported Individual or Situational Influences

Prior to the intervention this informant felt that he needed to make internal changes to change his physical activity behavior. Following the intervention he still believed that he needed to make attitudinal changes paying special attention to attitudinal blocks to participating in physical activity behavior.

Reported Advice to Others

This informant made several recommendations to those who wish to become more physically active. He suggested that it was important to identify goals and objectives, to be accountable to yourself and to others and to log activities and document your program. He suggested specific practical actions including reading lifestyle magazines to increase knowledge about lifestyle and physical activity. He felt that it was important to share objectives with others. Finally, he suggested finding someone who could serve as a practical lifestyle example. In his individual critique, this informant highlighted the importance of developing a perception of value for physical activity based on your own family values and experience. Reflect on the condition of your parents and siblings to shape a degree of interest in physical activity and motivation to be active later on in life.

Informant's Independent Critique

This informant reported being in the stage of contemplation at the time of the critique. He indicated that his physical activity level had regressed over the past three months. He had changed jobs and was accommodating to his new position. His new job demands did not allow him to walk during the lunch hour as he had been doing following the intervention. Although he was currently less active than prior to the intervention he was strongly motivated to get back to his previous physical activity level. He was motivated to keep his weight down and to reduce his stress through regular physical activity. He indicated that he did not value physical activity less. His relapse was due primarily to changes in his employment situation. The informant strongly agreed with the interpretations for the intervention effect and suggestions for improving the intervention. He strongly agreed with the interpretations related to affective attitude, control beliefs, advice to others, individual and situational factors. He also confirmed the interpretations concerning instrumental attitude and normative beliefs. This informant provided additions or modifications to several of the interpretation paragraphs. Based on these comments the interpretations were revised.

Informant P3 (Preparation)

Description

This informant was a 49 year old male faculty member of the university. He has obtained both a Ph.D. and medical degree. The informant completed the Par-Q evaluation with no reported reasons why physical activity was not advisable without medical supervision.

Stage of Change Classification

At the time of the initial telephone interview the informant reported exercising some but not regularly. This statement classified the informant in preparation for adopting physical activity behavior.

Reported Intervention Effects

This informant indicated that his job was sedentary with clusters of activity. His job was more active in the past but has become more sedentary. He has been active since the age of 14. The main reason he began to exercise regularly was to reduce his problems with back pain. Prior to that he had had periods when he exercised less than once per week. This informant stated that he found the discussions very interesting. This informant reported being in preparation during the recruitment call and during the post intervention interview. He placed himself in maintenance on the stage of change questionnaire during the follow-up interview, indicating that he maintained activity two or three times per week. From the qualitative interviews I believe that this was an evaluation of the regularity and intensity of his activity, rather than an actual change in behavior. The informant swam regularly for several years, swimming twice a week for one kilometer each session. He did quick walks on weekends occasionally. The informant felt that the counseling program enhanced his motivation but had little effect on his habits. The counseling encouraged and reinforced his current behavior by encouraging him to pay attention to it. The program was flexible and adaptable. He now believed that he should do more physical activity. The program was good for gathering information and provided appropriate information to increase motivation. The intervention paid attention to what activity he was doing and reinforced that what he was doing was good. The program was adapted to his level and needs paying attention to the specific informant. The questioning was interesting and allowed this informant to explore his own motivations and attitudes.

Suggestions for Improving the Intervention

The informant felt that the counselor was quick to adapt to the individual situation, but did not give enough specific advice on personal shortcomings and problems. The program would be more effective if it commented on what expectations the counselor had for the informant to do things differently. He felt that asking more specific questions rather than general ones would help the counselor to give more specific advice. He felt that motivation comes from within but some activities are inherently enjoyable. He would benefit from counseling to discover what would make physical activity more enjoyable for him. Counseling could do more to address specific barriers and to overcome them. Superfluous information could be removed from the counseling. More work was needed to match the counseling to the knowledge level of the informant. Not much could be done to overcome his busy schedule. Maintaining his current level would allow this informant to take on more leisure activities when his work changed or when he reached retirement.

Reported Attitude and Belief Effects

Instrumental attitudes

Initially this informant reported that time was the only cost to involvement in physical activity. During the follow-up interview he indicated that there were no real costs to being active at his current level. On the initial interview the informant concentrated his perceived benefits on protective health factors. Reductions in back pain, illness and stress were some of these protective factors. Following the intervention and during the follow-up, this informant reported benefits such as physical and psychological invigoration. In summary, more intrinsic positive benefits were reported being associated with physical activity.

Affective attitudes.

This informant's comments became more specific as the study progressed. This may be an indication that he was paying more attention to perceptions of enjoyment. Much of this informant's enjoyment came from intrinsic benefits such as a more optimistic attitude when physically active. Many negative comments changed to positive following the intervention and during the follow-up interview. Dislikes associated with physical activity were consistent throughout the study. Much like the perceived enjoyment, the discussion of dislikes became more specific following the intervention. One of the reported dislikes was difficulty beginning activity. The informant disliked the hypoxia at the beginning of his swims. If counseling were continued, attention should be directed at his warm-up activities prior to beginning his swims.

Control beliefs.

The original facilitators mentioned by this informant included the proximity of facilities, the positive relationship associated with physical activity from his youth and the positive physical feeling and freedom from back pain he obtained from remaining active. He indicated satisfaction with his current level of physical activity. Following the intervention he added some facilitators such as support from his family and spouse and his belief that physical activity was good for him. If there was any change in facilitators it was a reduction of attention paid to it on the follow-up interview. His initial perceived barriers were busy work, distance to work and restrictive weather. The attention to barriers was reduced during both the post intervention interview and the follow-up.

Normative beliefs.

This informant reported the majority of his social support came from family. He indicated during the initial interview that his strongest support came from his spouse. He expanded on the family support for physical activity during the post-intervention interview and repeated those comments during the follow-up interview. There was no perception of social discouragement expressed at any point in this study.

Reported Advice for Others

This informant recognized the difficulty in changing ingrained habits and felt fortunate to have made certain changes. He suggested that different people have different needs so individuals must find the thing that motivates them. He stated a belief that two or three sessions of exercise weekly was enough. It might help to find someone experienced with physical activity. Like this counseling, it would give people someone with whom to discuss thoughts and feelings. Even a busy person should be able to find time to be active once or twice a week if they can become motivated.

Informant's Independent Critique

This informant classified himself as a maintainer during the critique of qualitative interpretations. He was still active swimming. Although he reported being active about the same as prior to the intervention he reported that he had been swimming three times a week for the past two months. This was an increase in his weekly frequency of activity as compared to following the intervention or during the eight-week follow-up. He indicated that he still valued physical activity. This informant strongly agreed with all of the paragraphs interpreting his qualitative interviews. He made no specific comments indicating discrepancies, omissions, or additions to the interpretations.

Summary of Reported Individual Intervention Effects

The individual results presented in this section will be amalgamated and synthesized during the discussion of this paper. To get an overview of the effects suggested during from the qualitative interviews, a table is presented that overviews how each individual informant has responded to the intervention. This information is presented in Table 8. This is only an overview, the information will be developed more comprehensively in the discussion to follow.

Table 8

An Overview of the Reported Intervention Effects

Meet #	***STAGE***				***ATTITUDE***				***INTERVENTION***			
	1	***2***	***3***	***SIC***	***1***	***2***	***3***	***SIC***	***1***	***2***	***3***	***SIC***
PC1	PC	CON	CON	PRE	NA	I,C	I,C	I,C	NA	E	E	E
C1	CON	CON	CON	PRE	NA	I,A, C,N	I,A, C,N,	I,A, C,N	NA	E	E	E
C2	CON	ACT	ACT	PRE	NA	I,A, C,N	I,A, C,N	I,A, C,N	NA	E	E	E
C3	CON	PRE	PRE	PRE	NA	I,A, C,N	I,A, C,N	I,A, C,N	NA	E	E	E
P1	PRE	CON	CON	PC	NA				NA	E	E	E
P2	PRE	PRE	PRE	CON	NA	I,C, N	I,C, N	I,C, N	NA	E	E	E
P3	PRE	PRE	MAN	MAN	NA	I,A, C,N	I,A, C,N	I,A, C,N	NA	E	E	E

Key

SIC=informants independent critique, NA=not applicable(question was not discussed)
Stages: PC=precontemplation, CON=contemplation, PRE=preparation, ACT=action, MAN=maintenance
Attitude Change: I=instrumental , A=affective, C=control, N=normative
Intervention Perceptions of Intervention: E=effective, NE=not effective

To support the qualitative generation of information about attitude and belief effects of the intervention, a scale was completed by the informants with each interview (see Appendix B). The attitude and beliefs concerning physical activity were the object of these scales. Five adjective pairs addressed instrumental attitude, seven pairs addressed affective attitude concerning physical activity. Two seven-point rating scales were used to assess subjective norm. Two seven-point rating scales rated perceptions of behavioral control. A global measure of attitude was constructed by averaging the 12 instrumental and affective scales. Global subjective norm and perceived control were assessed by averaging the two scales for each belief. The data gathered from these scales are summarized in Table 9.

Table 9
Quantitative Attitude Averages

	Global Attitude (instrumental and affective)			***Global Control Beliefs***			***Global Subjective Norm Beliefs***		
Interview	***#1***	***#2***	***#3***	***#1***	***#2***	***#3***	***#1***	***#2***	***#3***
PC1	4.67	5.25	5.58	4.00	3.50	5.00	4.50	5.00	5.00
C1	5.00	5.33		4.50	5.00		4.00	4.50	
C2	7.00	7.00	7.00	5.00	6.00	6.50	7.00	7.00	7.00
C3	5.58	5.50	5.50	6.00	5.50	5.50	6.00	7.00	7.00
P1	6.67	6.42		4.00	4.00		7.00	6.00	
P2	5.67	5.58	5.58	5.50	6.00	5.50	7.00	7.00	6.50
P3	6.00	6.08	6.50	6.50	6.50	6.50	7.00	7.00	7.00

* all scores are a scale average out of a possible rating of seven

There was a lack of confirmation of the qualitative attitude and belief reports by the quantitative scale of attitude. The results were mixed when global measures of attitude, control and subjective norm were compared to qualitative interview interpretations of the same three constructs. The qualitative changes in attitudes were supported by the informants' independent review. Both agreements and conflicts are summarized in Table 10. The table indicates if attitude was demonstrated to change or not.

Table 10

Comparison Between Qualitative and Quantitative Attitude Interpretations

	Global Attitude		***Perceived Control***		***Subjective Norm***	
Informant	Qual	Quant	Qual	Quant	Qual	Quant
PC1	yes	yes	yes	yes	no	yes
C1	yes	yes	yes	yes	yes	yes
C2	yes	no	yes	yes	yes	yes
C3	yes	no	yes	no	yes	yes
P1	no	no	no	no	no	no
P2	yes	no	no	yes	yes	no
P3	yes	yes	no	yes	no	yes

Discussion

The goal of this discussion is to focus the results and interpretation in order to develop insights and understanding, not to suggest universal truths. It would not be appropriate to apply any given counseling intervention to a diverse population. Each of the three theories upon which the intervention was based suggest evaluation of informants and application of counseling based on the needs of the informant. Each client must be a participant in the application of a flexible individual program based upon sound theories such as stage theory, short-term counseling and motivational interviewing. Such an eclectic intervention pulls from the intervention literature to provide direction to the subject within a non-directive approach. As suggested by Taylor and Bogdan (1998, chap.7), understatement adds to the credibility of qualitative studies while overstatement detracts from such credibility. Sweeping generalizations will be avoided recognizing the limitations of the methodology. It was recognized that the population was restricted in many ways. Informants were all males between the ages of 35 and 55. They were all employed within a university environment. Strengths are developed in that the informants were selected purposefully to gather from across the stage of change continuum.

The discussion to follow will not disregard the individual nature of this data but rather will highlight variance and commonalties within the stages of precontemplation, contemplation and preparation. It will include: a discussion of the reported intervention effects and potential improvements to future counseling interventions, a detailed discussion of the belief changes and the consolidated suggestions of individuals in each of the three stages. This will provide practical advice for others from the perspective of those in the midst of behavior change. From this discussion the preliminary intervention constructed for this research can be fine tuned and optimized for use by clinicians in the modification of physical activity behavior.

Precontemplation and Contemplation

A note on precontemplation.

Precontemplators were present in the university population but were reluctant to participate in this research. The agreement of only one precontemplator to participate was instructive concerning the reluctance of precontemplators. Two alternate interpretations might be offered for this observation. Either informants in precontemplation are not available for counseling interventions or the approach for attracting such subects into an intervention needs refinement. Both alternatives warrant further investigation. For those who cannot be brought into contemplation using proactive interventions, community-based promotions hold promise. Precontemplators' attitudes toward physical activity may be best influenced by diverse health promotion efforts including media campaigns and community development. It has been suggested by several authors that this is the best approach to changing the attitude and eventually the behavior of precontemplators (Brownell, Stunkard & Albaum, 1980; Donovan & Owen, 1994; Godin, 1994; Prochaska & DiClemente, 1983). Some individuals may be on the verge of considering physical activity behavior change. The inclusion of one precontemplator in this study opens the door to insight on those precontemplators who do not have strong resistance to considering change.

They might be termed borderline contemplators: as those who are not entrenched in reluctance, rebellion, resignation, or rationalization (DiClemente, 1991). The success of the precontemplator in this intervention supports the need to investigate proactive approaches aimed at individuals with low intention to change their physical activity behavior. There were indications that this subject was similar to the contemplators in many ways, but was distinct as well. The major difference was that the contemplators made more evident changes in attitude concerning control of change and normative influences. Investigation guided by the concept of resistance in precontemplators (DiClemente, 1991) may provide useful insight and understanding of how to approach precontemplators. The coping strategies (Janis, 1992) chosen by people need further investigation in application with precontemplators and across the range of stages of physical activity behavior change.

Combining the two stages.

The precontemplator involved in this study was in a position to make a transition into contemplation. As DiClemente stated in 1991 there are many reasons to be in precontemplation. Although the precontemplator in this study was happy with his sedentary life he was open to discussing the benefits of physical activity. He had not seen enough evidence to convince him of the personal benefits of increasing his activity. He was not strongly reluctant to consider activity or rebellious to the thought of discussing it. The precontemplator involved in this study represents those precontemplators with mixed feelings toward physical activity. The fact that he participated in the intervention demonstrates that on a continuum he was approaching contemplation of making physical activity change. For that reason he will be included with the three contemplators for the sake of this discussion. The moment he agreed to participate he more realistically was classified in the stage of contemplation. His move into contemplation was supported by his personal rating as a contemplator following the intervention. The proactive approach during which this informant was called was a large part of the intervention for the precontemplator. He will be grouped with the contemplators for ease of discussion from this point.

Reported intervention effects.

The precontemplator and three contemplators indicated that the intervention was effective for them personally. This report was supported by positive stage movement, belief changes and suggested changes in moderate physical activity. It was commonly reported that individuals were more active following the intervention, during the follow-up and eighteen months following the intervention. Not only were they active in terms of strictly defined physical activity but in terms of moderate daily physical activity. This was reported in spite of the fact that the question about moderate physical activity behavior was not part of the interview format. The change in moderate levels of daily physical activity and the informants' desires to discuss changes draws attention to active living and regular moderate physical activity. It has been suggested that active living is a stepping stone for integrating regular physical activity into the daily routines of sedentary individuals (Blair, Brill & Barlow, 1994, p. 30). The actions and words of the informants in both precontemplation and contemplation suggest that the promotion of active living serves as an inroad to promoting regular physical activity to a number of sedentary individuals who have been overlooked by previous interventions.

Suggestions for improving the intervention.

In general there was a high level of satisfaction with the intervention. Each of the informants asked for more information specific to the activities they enjoyed, or at least to help them find the types of activities they would enjoy. Each of the informants recognized specific concerns and would have appreciated further attention directed at those concerns, focusing the intervention in that direction. The precontemplator on the other hand wanted more structure in terms of a fitness or health assessment, equipment and specific physical activities. He was not specific on what activities he was interested in, but in retrospect it seems he was searching for more ideas to find activity in which he would be willing to participate. The suggestions by each of the four informants indicate the importance of balancing the directive and non-directive counseling, to allow the informant to maintain control of the process but to guide them optimally. As Rollnick et al. (1992) suggest, client-centred motivational interviewing requires structure at some points and flexibility at others. The responses of these four informants supports the necessity to tailor counseling to the individual client's need for structure and autonomy. This balancing act underscores the need for an individualized counseling approach where subtle distinctions can be made and applied to a theoretically-based counseling intervention.

Reported attitudes and beliefs toward physical activity.

Four aspects of attitude were considered in this study of individuals from the early stages of physical activity behavior change. Affective attitude, instrumental attitude, control beliefs and normative beliefs were investigated during the three qualitative interviews; prior to, following and again eight weeks following the intervention. The data were scrutinized to assess changes in attitude and beliefs subsequent to the intervention.

The beliefs of all informants in precontemplation and contemplation changed following the intervention. The changes were most prevalent in instrumental and control beliefs. In terms of instrumental beliefs costs were more realistically evaluated by the informants following the intervention. Benefits were viewed more internally following the intervention. In many cases the benefits were actually experienced by informants rather than just being expectations. All informants experienced positive changes in control beliefs. Informants had obtained a degree of self-motivated behavior, taking control of the facilitators of their physical activity. Barriers were realistically evaluated and to a degree overcome following the intervention.

Contemplators made positive attitude changes not achieved by the precontemplator. All the contemplators progressed to a point where they valued both the personal and situational aspects of control of their physical activity behavior.

The contemplators had positive changes in affective beliefs not experienced by the precontemplator. Although more enjoyment of physical activity was perceived, the major adjustment came in the perceptions of displeasure associated with physical activity. Perceived dislikes were heightened following the intervention due to realistic evaluation. By the time of the follow-up interview perceived dislikes had been reduced and in some cases former dislikes were now perceived as elements of enjoyment. Changes in perceived affect illustrate the ability of informants to realistically evaluate attitudes toward physical activity and control their motivation to become more physically active.

Contemplators sought additional sources of social support for their physical activity. These individuals either devalued or disregarded social discouragement. These individuals demonstrated more changes in attitude leading to internalization of their motivation. The consistency of belief changes in contemplators was encouraging. This successful change suggests the counseling intervention was effective at changing the beliefs of contemplators to physical activity and to a lesser degree change to the beliefs of the precontemplator. It was logical that the beliefs of precontemplators require more effort and time to change. It was encouraging to see the changes in behavior of the precontemplator eighteen months following the intervention. Although beliefs were not revisited eighteen months following the intervention the changes in behavior maintained for the extended time suggest that motivation had become internalized to a degree. In this case the changes in instrumental and control beliefs were supported but additional changes were not part of the inquiry a year and a half post-intervention. It was suspected that changes in affective and normative beliefs may be developing as part of this precontemplator's repertoire. Extending the measurement of attitude over a longer time period might provide further insights into the process of change in those who are moving along the stage of change continuum.

Reported advice for others.

Several pieces of advice were suggested by the precontempator and contemplators for others wanting to change their physical activity behavior. The importance of working on the decision to be active was stressed. It was noted that changing behavior was not a simple task. It requires preliminary work to develop objectives that are meaningful to the individual. Decisions to become active must be met with both gratifying and enjoyable activities. For successful change to occur these individuals agreed that it was important to feel in control of decisions. Therefore a degree of indirect counseling was critical according to these informants. After setting objectives and selecting enjoyable activity alternatives the next piece of advice was to set up a support structure including searching out experienced advice and counseling. Looking for active individuals to associate with and to provide examples of active lifestyle was also included in the techniques suggested to support physical activity. Finally the benefits of active living were recognized by all the informants in precontemplation and contemplation. It was suggested that beginning with moderate activities, such as walking, or taking the stairs was a good place to start for others who were inactive. All of these individuals had become more active in moderate physical activity and felt that this made their transition to strictly defined physical activity more probable.

Informant's independent critique.

Eighteen months following the intervention an independent subject critique was completed by each of the informants. At that point, stage placement and behavior was revisited. All the informants in precontemplation and contemplation reported being more active than prior to the intervention. They had all progressed in stage report with some relapse back to earlier stages. On a positive note all informants remained in stages above their pre-intervention level. The stability of stage change demonstrated individual effect. The precontemplator made the largest shift of behavior, moving all the way to a period of maintenance. In-depth investigation of stage movement was needed to more closely examine movements over extended periods. The suggestion of informants to maintain helping relationships may support the need for extension of counseling in a limited way through each stage until informants have internalized motivation for extended periods and have maintained behavior change. During contact with informants, eighteen months following the intervention as a counselor, I recognized the effect major life events have on specific behaviors. Counseling interventions must take into consideration the events that occur in informants' lives. Additional forms of counseling outside the expertise of physical activity specialists may be indicated but physical activity counseling can serve as an adjunct therapy in such cases. In such cases physical activity may be helpful in working through events of life that cause personal stress. A holistic view of life suggests that physical activity was not independent to other life events, but rather all aspects of lifestyle deserve attention.

Preparation

Reported intervention effects.

The three informants originally classified in preparation exhibited influences of the intervention but the influences were not as clearly demonstrated as with the individuals in earlier stages. Prior to the follow-up interview no changes in strictly defined physical activity had occurred, but informants reported increases in moderate physical activity. The lesson taken from this report was that the monitoring of physical activity behavior needs to be sensitive to various levels of physical activity. As with the informants in precontemplation and contemplation the behavior of informants classified in preparation should be evaluated on several levels. Moderate activity, as well as intense activity deserve attention within the context of physical activity counseling. From the informants' comments it was suggested that changes in moderate activity are valued and in some cases they are deemed important changes by the informants. In addition changes in moderate activity are viewed as important transitions for those attempting to integrate strictly defined exercise into their schedule.

All the preparers indicated higher levels of motivation following the intervention. By the time of the eight-week follow-up one of the three preparers indicated that his motivation had dropped. He questioned his ability to participate in physical activity without aggravating a serious back problem. I interpret some of his resignation to be inactive being related to his past history of competitive physical activity. He enjoyed competitive sport which was difficult for him now due to the risk of aggravation to his back in competitive team sport. Searching for enjoyment in non-competitive physical activity was difficult, with his past history being closely tied to enjoyment of competitive sport. The key for this individual to become active most likely lies in finding physical activities which are enjoyable and realizing benefits to his health and wellness from activity rather than aggravation of his back pain. Reductions in his back pain may be possible from weight reduction and muscle balance resultant from regular physical activity. The treatment of this individual falls outside the scope of this project. His back problems may be limiting his motivation. He needs to be involved in a program to find enjoyable activity that will minimize or reduce his back pain. As he stated, the counseling intervention would be more successful if motivated informants were selected to participate in this intervention. I don't interpret motivation as the problem, but care should be taken to select informants who are apparently healthy. For informants with specific medical problems programs need to be tailored to meet their needs. Interventions could be effective with the proper tailoring of a program to meet the objectives of clients with specific physical concerns. This informant although healthy in most aspects, was outside the scope of criteria for selection to the study. His involvement in the study though provides insight into the creation of physical activity counseling interventions. Paying particular attention to the activity history in relation to an individual's expectations for future activity may provide useful background information for counseling. Past physical activity patterns can hamper continued physical activity. For example this informant, in attempting to participate in competitive physical activity, may have become frustrated by continued aggravation of a back problem due to participation in inappropriate activity. Working through that frustration and finding solutions to present barriers may be the reward that motivates informants with past histories to initiate more enjoyable physical activity.

In two cases the preparers in this study changed their evaluation of stage based on more realistic perceptions of their physical activity gained during the intervention. The two preparers moved in divergent directions. Without actual changes in behavior, one informant questioned his initial classification, feeling he was only active at moderate levels prior to the intervention. The other informant placed himself in maintenance based on the regularity and intensity of his swimming. He fell short on the frequency criteria defining regular physical activity for measurement in this project. Accuracy of stage classification was brought into question by the comments of these two informants. Classification may be aided by an experienced counselor with an understanding of stage theory. Application of counseling strategies may be better tailored to subject stage needs if guided to a degree by a counselor with a knowledge of psychological theory. Part of the role of counseling may be to guide informants in recognizing their realistic activity levels. In the case of the subject who moved into maintenance without actual behavior change there was an important change noted eighteen months following the intervention. At that point he had modified his regular physical activity routine to increase the frequency to three times a week, meeting the criteria for regular physical activity for this project. Care should be taken in counseling active informants to get a clear picture of their activity level. In the case of this last subject, although he was active for many years swimming at high intensities for one hour two times a week, he did not meet the three times a week criterion. Individuals need to have their routine examined closely. One individual may be getting more activity in two sessions than other individuals get in three or more. Definition of regular physical activity should be tempered by the detail of the individual case being examined. Much of this detailed measurement can be missed without attention to the individual subject.

Suggestions for improving the intervention.

Comments made by the individuals in preparation centred around making the counseling more specific and extending the counseling contact to maintain support. It was suggested that specific attention was required in two areas. With individual informants direct attention should be paid to problem areas, or physical limitations specific to the individual. More attention should be applied to the selection of activities by informants. Based on these suggestions the counseling intervention needs some modifications. It seems critical to work with informants until they have found activities that are enjoyable, practical and that will meet their objectives. Supporting continued motivation may require continued counseling as informants progress through the stages. If contact is not maintained with a counselor there are additional ways to maintain counseling power while motivation is internalized. Continued support may come in the form of rewards, audio-visual programs, or handouts. These forms of contact were suggested by preparers as ways to improve the counseling intervention. As Janis (1983) suggested retaining the motivation is contingent on continuing a positive attitude toward the change, maintaining contact, providing reminders of personal responsibility and building the confidence for independent success. These aspects of Janis's theory were supported by the comments of the preparers in this study.

As a counselor I felt that this intervention was lacking in several ways. The attention to changing attitude was necessary but expectations of the informants were not met without attention to changing behavior. Future intervention with preparers should pay attention to behavior. Logging of physical activity and a fitness assessment in selected cases would provide additional information on the informants and serve to meet their expectations, therefore supporting internalization of their motivation. As with the informants who placed themselves in precontemplation and contemplation, subtle changes occurred in moderate activities which were not recognized or openly rewarded by this intervention. The options for counseling individuals in preparation should include both experiential and behavioral tools. As informants advance through the stages, a process of behavioral modification should begin. In the preparation stage counseling should include logging activity and working with the informants to plan specific ways to make their physical activity a regular part of their week.

Reported attitudes and beliefs toward physical activity.

The variability of changes in beliefs provides insight into the effectiveness of this counseling intervention and opportunities to make alterations to the intervention for improving its effectiveness in future applications. Changes occurred in the two aspects of attitude, normative and control beliefs associated with changes in physical activity behavior. The informants who moved furthest on the stage continuum made the most recognizable changes in attitude. The informant who increased physical activity to a degree had some changes in attitude corresponding to the level of behavior changes. Finally the informant whose attitude regressed also reported regression in his stage and level of physical activity. In both behavior and attitude he seemed to have become resigned to the fact that he was becoming progressively more sedentary. As an example, the informant who reported more enjoyment associated with physical activity had positive stage change, the subject who made no perceived changes in affect maintained his stage. The informant who had a more negative affective view moved in a negative direction along the stage continuum. Similar behavioral relationships occurred with instrumental attitude, control and normative beliefs in this group of informants.

Additional insights about the attitude of these three preparers were gained. One insight was that "realistic" sources of enjoyment are required for most individuals to successfully initiate physical activity change. Informants were searching for activities that they felt would be enjoyable. The counseling intervention developed for this study would benefit from a larger focus on working with informants to find realistic activities that would be enjoyable to them. Activities from the past provide a vision of what activities might be enjoyable. In many cases these activities can be initiated again and maintained but in many cases the activities are no longer realistic for the individual, difficult to initiate or counterproductive to the objectives established by the individual. For example, team sports require the participation of other individuals of similar physical skill. Although sports are pursued by adults as they age it is sometimes difficult to find opportunities for participation. This difficulty may limit opportunities for some individuals. The objectives of people change over time. Working with a counselor to first determine realistic objectives and then search for enjoyable activities that meet the objectives is a critical step in developing the opportunity to establish a pattern of physical activity.

Slow belief change can translate into delays in behavior change. The exploration of belief change contributes to my interpretation that change occurs at different rates in different individuals. Of course this relationship is based on the theory of planned behavior which suggests beliefs lead to intention and in turn to behavior change. A program with limited borders may not satisfy the guidelines suggested by Janis and Mann (1982). That is to say an intervention may not be effective if limited to four weeks. In some cases after four weeks informants may be ready for independent success. In other cases, changes in attitudes and beliefs take additional time and counseling needs to be sensitive to the needs of the informant. The time taken to build motivation and utilize motivational power was dependent to a large degree on the nature of the individual. Attitudinal changes take time. In this group the most dramatic changes in stage were achieved by the subject who made the quickest changes in attitude, specifically in control beliefs. These factors suggest that counseling interventions may vary in duration depending on the latency of attitude change and the degree of entrenchment of motivation to participate in physical activity. Recognition of critical attitudinal changes may be an indication that people are ready to take personal responsibility for their behavior change. One such indicator was the recognition by individuals that both individual and situational factors are critical to their initiation and maintenance of physical activity. In the short-term, individuals in this intervention increased the value of individual factors in determining their behavior. Informants who held this contention as the intervention began or developed it during the intervention tempered it as they habitualized physical activity. Having a degree of personal control which also recognizes the realistic effects of personal and situational control may be the optimal attitude to initiate and maintain physical activity. Studies with individuals in the later stages of change may provide support and insight into these interpretations.

Realistic evaluation of the situation surrounding an individual may play a role in facilitating their movement along the stage continuum. Much like other beliefs, normative beliefs need attention to aid in behavior change. All informants in this group reported a degree of social support. As the study progressed to the post-intervention interview, more attention was paid to social support by the individuals who increased their physical activity behavior. As a counselor I interpreted attention to this aspect as important. Increasing attention to normative questions of support or discouragement can aid in positive stage change. As with other beliefs, attention to this component improves the opportunity to habitualize physical activity. Simple self-reported social support was not a clear indication of how support is influencing physical activity behavior.

Reported advice for others.

Advice was provided by individuals in preparation for others changing their physical activity behavior. The advice can be concentrated in two themes. The first suggestion was to establish supportive accountable relationships. Relationships with experienced exercisers or a counselor were among the suggestions to fall under this theme. Starting some form of activity was the second theme. It was suggested that increasing daily activity, even moderate activity was a critical step to becoming involved in regular vigorous activity. The consensus was that active living has benefits on its own but also serves as a primer to more intense regular physical activity.

Informants' independent critique.

In independent critiques of the interview interpretations eighteen months following the intervention, it was reported by two informants that they had relapsed into stages prior to preparation. One of these individuals had changes in attitude corresponding to his change in stage. His negative movement on the stage continuum was a continuation of the movement he had established prior to the intervention. He had moved to contemplation following the intervention, where he remained at the time of the eight-week follow-up interview. The slide had continued with his stage reported as precontemplation during the independent critique. A second individual who had regressed into contemplation by the time of the independent critique indicated that the change in behavior was in great part due to a change in employment that did not allow his regular pattern of walking during his lunch hour. This influence supports the insights suggested earlier that attention during counseling should be paid to the effects of major life changes. Although his behavior had changed he supported the changes that had occurred in his attitudes toward physical activity. The changes in attitude had been maintained eighteen months following the intervention. He indicated his intention to revert to his positive change in physical activity behavior. The third subject supported the changes in attitude and behavior he had made due to the counseling intervention. He reported remaining in maintenance over the year and a half period since the intervention, but indicated an increase in the frequency of his physical activity. The change in frequency was a positive step moving him to a level of true maintenance according to the definition of regular physical activity accepted for this study. This change was congruent with the counseling suggestion that the real improvement he could make to his program of physical activity was to add one additional session of physical activity to his weekly routine. Each of the three individuals felt that the intervention was an effective option. Suggestions were made to improve the effectiveness of the intervention and one subject suggested that he was not a good candidate for the intervention. In general the group was supportive of the intervention although the influence on behavior was variable in the three individuals.

Review

The informants in this initial study all reported being influenced by the intervention but the degree of influence varied. The influence was definitely stronger on those in precontemplation and contemplation than the informants classified in preparation. The precontemplator and the contemplators all demonstrated movement along the stage continuum and demonstrated changes in exercise behavior. The preparers in this investigation made little change in strictly defined exercise. This group of informants needed more specific comments and possibly more attention to changes in their moderate activity, or what could be termed their active living. Based on this discovery a seven-day recall format was piloted during the follow-up interview of informants in the study (Taylor et al, 1984). An assisted 7-day recall was administered to the informants at all interviews in study two in an attempt to pay particular attention to moderate activity. The effective components will be applied in a follow-up study. The effectiveness of components was gleaned from informants' comments and the counselor's interpretations. Even without a demonstration of effects and causal relationships the qualitative data has value. The individual variability demonstrated provided information on which to base modifications to interventions for informants in preparation. The next study in this series should have a revised intervention to integrate changes suggested by this initial study.

Conclusions

To conclude this paper the data provided by the informants will be focused to produce a number of practical adaptations that can be applied as part of the proposed counseling intervention. Although having the counselor active in the research process has drawbacks such as beginning the intervention with preconceived biases, it also provides a number of benefits. The counseling can be developed based upon both theory and experience. As suggested by Chenial and Maione (1997) one approach is to build upon previous constructions to develop an intervention which makes good sense. As a counselor I brought forward ideas, hunches, biases, blind spots and questions. These were examined and challenged to make new sense of the stage of change process as it applies to physical activity counseling. Based upon a number of observations, multiple sources of data and informant checks, I feel confident in making some recommendations for helping individuals in the early stages of physical activity behavior change progress along the stage of change continuum.

Reviewing the counseling approach prior to suggesting practical changes is wise at this point. The guiding principle of the counseling was that it was reactive to the individual and his situation. This principle was based upon the suggestions of Miller and Rollnick (1991) that counseling should be both directive and non-directive, offering advice and feed-back when appropriate, building motivation with specific principles and strategies and remembering the importance of a client-centred approach where clients develop goals that they can accept. The objective of the counselor was to assist the client to explore conflicts, encourage the expression of reasons to change and arguments to change. The program of physical activity counseling was structured upon a sound theoretical basis. In addition to short-term counseling (Janis, 1983) and motivational interviewing (Miller and Rollnick, 1991) which suggest development use and retention of motivational power within a structure which allows both personal control and counselor direction, stage theory (Prochaska and DiClemente, 1983) allows for application specific to the attitudes of individual informants. Practical counseling interventions based upon the stage theory have been integrated within this theoretical structure to influence the cognitive or attitudinal prerequisites for changing physical activity behavior. The theory of planned behavior proposes that beliefs and attitudes underlie the intention to be active. With this intention behavior change is possible. Given this contention it was suggested by informants that other factors may in turn influence behavior. Behavior itself affects beliefs and attitudes. That suggests that the relationship between beliefs and behavior is not necessarily uni-directional.

Several insights suggest modifications to the counseling intervention utilized to help precontemplators and contemplators. Suggestions include:

- Precontemplators that respond to proactive recruiting into counseling interventions can be approached with the same intervention as would be used with contemplators. The counselor should be prepared to allow for increased latency of change. More attention may need to be directed at realistically evaluating and modifying beliefs.

- Moderate activity should be monitored as part of an intervention. Changes in moderate activity should be promoted as ends in themselves and used as a path toward habitualizing regular exercise, or intense physical activity.

- Time should be dedicated to work with individuals to realistically evaluate their beliefs. For example, barriers, costs and benefits are more realistically evaluated as direct attention is paid to them. Experience with physical activity helps individuals to get a clear picture about what influences their beliefs toward physical activity. This demonstrated that the relationship between beliefs and behavior works in two directions. Informants who experienced active lifestyle behavior noted changes to their belief structure concerning physical activity. Self-reports of physical activity also deserve this same attention to realistic evaluation.

- Counselors should promote to individuals the importance of working on developing beliefs that facilitate the initiation and maintenance of physical activity behavior. Time should be spent developing objectives that are meaningful to the individual and on finding physical activities that are both enjoyable and gratifying. Supportive relationships should be developed which facilitate regular physical activity.

- Janis' contention that motivational power developed in short-term counseling needs to be maintained is important (1983). If practical, counseling should be continued as individuals pass through the stages of change. The time for informants to develop personal responsibility and intrinsic motivation for their activity behavior is highly individual. Counselor experience is crucial to judge the potential for independent success. In addition to counselor contact, establishment of relationships with experienced exercisers may help to maintain motivation to be physically active until the motivation becomes internalized.

- Physical activity behaviors should not be viewed in isolation. Major life events such as injury, retirement and marital breakdown have profound effects on physical activity behavior. Counseling should not ignore these events. If such events occur during counseling it is an opportunity to work through the barriers that discourage regular physical activity. Physical activity can be promoted as a source of relief from the stress inherent in life. Physical activity should not be viewed as a panacea. However, counselors should be aware of other resources to help individuals deal with crises and should develop a network of contacts for referral of individuals with special physical or psychological issues.

Several insights suggest modifications to the counseling intervention utilized to help in the stage of preparation. Suggestions include:

- The methodology developed for this study did not consider the importance of monitoring physical activity at a variety of levels. For individuals in preparation the evaluation of physical activity should be conducted with tools sensitive to various levels of intensity. As with the individuals in earlier stages it is important to monitor moderate physical activity. All additions of physical activity should be recognized as ends in themselves and as passages to levels of physical activity demonstrated to have substantial health effects. In short, active living and moderate activity is a good place to start when trying to become physically active.

- It would be useful to gather a history of physical activity behavior. Past physical activity has the potential to influence attempts to change physical activity behavior presently. Past frustrations with activity can have a negative effect on attitudes toward change. Even activities that were positive in the past can have detrimental effects. If those activities are no longer realistic for the individual, their application can cause frustration. The selection of activities should consider current limitations and objectives.

- Individuals in preparation do not always realistically categorize themselves in a stage of physical activity behavior. Even with a given definition of physical activity, classification by informants did not always accurately classify stage. Therefore prior to applying an intervention counselors should evaluate stage. The classification can be ongoing as the intervention progresses and used as a learning experience for the individual participating in counseling.

- According to the preparers involved in this intervention, relapse may be a problem. It was suggested that contact with a counselor be maintained, rewards be established, audio-visual presentations be used and handouts be provided, all as means of maintaining motivation. It was suggested that moving up a stage is as difficult for a preparer as for someone in any of the earlier stages and that counseling should continue as he progresses through the stages to maintenance.

- An intervention for preparers should include both experiential and behavioral aspects. Attention to behavior should include fitness evaluation, logging of physical activity by informants and detailed attention paid to a range of intensities of physical activity as a motivational tool. Close attention paid to physical activity behavior clarifies and amplifies discrepancies in order to motivate people. Such clarification and amplification is suggested by Miller and Rollnick (1991) to provide direction to people who are attempting to set realistic objectives.

- Attitude or belief change can be used as a guide to judge the likelihood of behavior change. Changes in attitude in these three preparers were reflected in stage change in each of the three individuals. Changes in beliefs may provide insight for counselors as they make decisions about reducing the direction given to individuals as they internalize their motivation and become confident of independent success.

- Informants suggested establishing accountable but supportive relationships that would help facilitate physical activity. This could take the form of experienced exercisers, or a physical activity counselor. A realistic interpretation of social support and discouragement increased the likelihood of maintaining behavior change. The informants in this study who realistically evaluated social support or its absence were able to utilize the support or compensate for its absence.

As a final statement it is possible to say that the counseling intervention experience applied to individuals was influential to a degree. This statement is based on the confirmation of interpretations by the informants. The association was stronger for the precontemplators and contemplators than it was for the preparers. The suggestions made provide guidelines for clinical application of the counseling intervention which provided the basis for this paper. Future investigation should evaluate the suggestions made to upgrade the effectiveness of interventions applied to individuals in the stage of preparation. Those recommended changes were primarily to apply more behavioral processes in addition to the experiential processes designed to influence the attitude of informants. The counseling format developed and evaluated in this paper should be evaluated in wider populations and by different methods to extend the generalizability of the counseling intervention.

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CHAPTER 3

Development and Implementation of A Fitness Counseling Protocol for Individuals in the Later Stages of Behavior Change

Introduction

The purpose of the second study was to develop and evaluate the effectiveness of a counseling intervention program for facilitating the physical activity involvement of individuals in the later stages of behavior change.

The intervention was designed to assist individuals to progress from their current stage of behavior to a higher stage on the continuum of stages of behavior change. A successful intervention with a client would be evidenced by his progressing to a higher stage of change. With informants in the later stages changes in both beliefs and behavior demonstrate success of the intervention. As in Study One, a qualitative approach involving multiple interviews with each informant enabled examination of both the process and outcome of the intervention. In addition quantitative measures of beliefs, attitudes, self-reported activity behavior and physical fitness provided collateral examination of the qualitative interpretations

The intervention in Study Two was similar to that for Study One but it was specifically shaped for individuals in the later three stages of physical activity behavior change. In the second intervention more emphasis was focused on behavior, not simply attitude change. In addition to the intervention focus on changing behavior, there was expanded emphasis on measurement of physical activity behavior. Informants logged their exercise and they were asked during interviews to provide a detailed description of their range of activity.

As previously discussed in Chapter One, individuals categorized into the final three stages of change have distinct characteristics. Individuals in preparation, action and maintenance are physically active at various frequencies or for various durations. Preparers are somewhat active but not at levels described to be optimal for health. They need to increase the regularity of participation. Those classified as actives are participating in regular physical activity but have done so for less than six months. This suggests that they are in the process of habitualizing physical activity and need to avoid relapse. Maintainers are active regularly and have been so for an extended period. These individuals need to fine tune their programs to meet their objectives and avoid injuries or other situations that would interfere with regular physical activity. At any point people can relapse to behaviors that represents regression to one of the earlier stages. This is termed the stage of relapse.

The counseling format devised for this intervention was applied in a reactive way to adapt to the needs of target individuals and their particular situation. This research differs from previous investigations in that it applies information from client interviews and considers individual counseling needs. As discussed in Chapters One and Two, three theories - "Stage Theory" (Prochaska & DiClemente, 1984), "Short-Term Counseling" (Janis, 1983) and "Motivational Interviewing" (Miller & Rollnick, 1991) - provided the basis for the counseling intervention.

Categorizations according to stage theory determined the expected benefits for each informant from the intervention program. It was anticipated that through counseling each individual would progress along a continuum towards healthy physical activity maintenance. Successful achievement of the research objectives depended on each informant achieving personal benefits from counseling. The personal benefits were interpreted from the qualitative interviews, reported activity levels and assessed fitness changes. The researcher's interpretations were subjected to critique and confirmation by the informants.

Although the same exercise definition was used in the stage of behavior change assessment as in the first study, a broader assessment of physical activity was incorporated in this study. Two separate measures of physical activity involvement were employed. First, a "comprehensive" measure of physical activity provided an assessment of the usual level of moderate and vigorous physical activity. Second, a "total" measure of physical activity provided a seven-day recall of all activity. This broader perspective of physical activity is consistent with the recent emphasis in Canada advocating an active living approach (Makosky, 1994). Many sedentary individuals who would like to enjoy the benefits of activity, find the transition to regular exercise difficult. In addition, recent evidence supports the health benefits of moderate and cumulative physical activity (Surgeon General's Report, 1996; Blair & Connelly, 1996; Dunn, Marcus, Kampert, Garcia, Kohl & Blair, 1997). Proponents of the active living approach suggest that integrating activity into the daily routine might be a more effective way to motivate many individuals (Gauvin, Wall & Quinney, 1994).

Methods

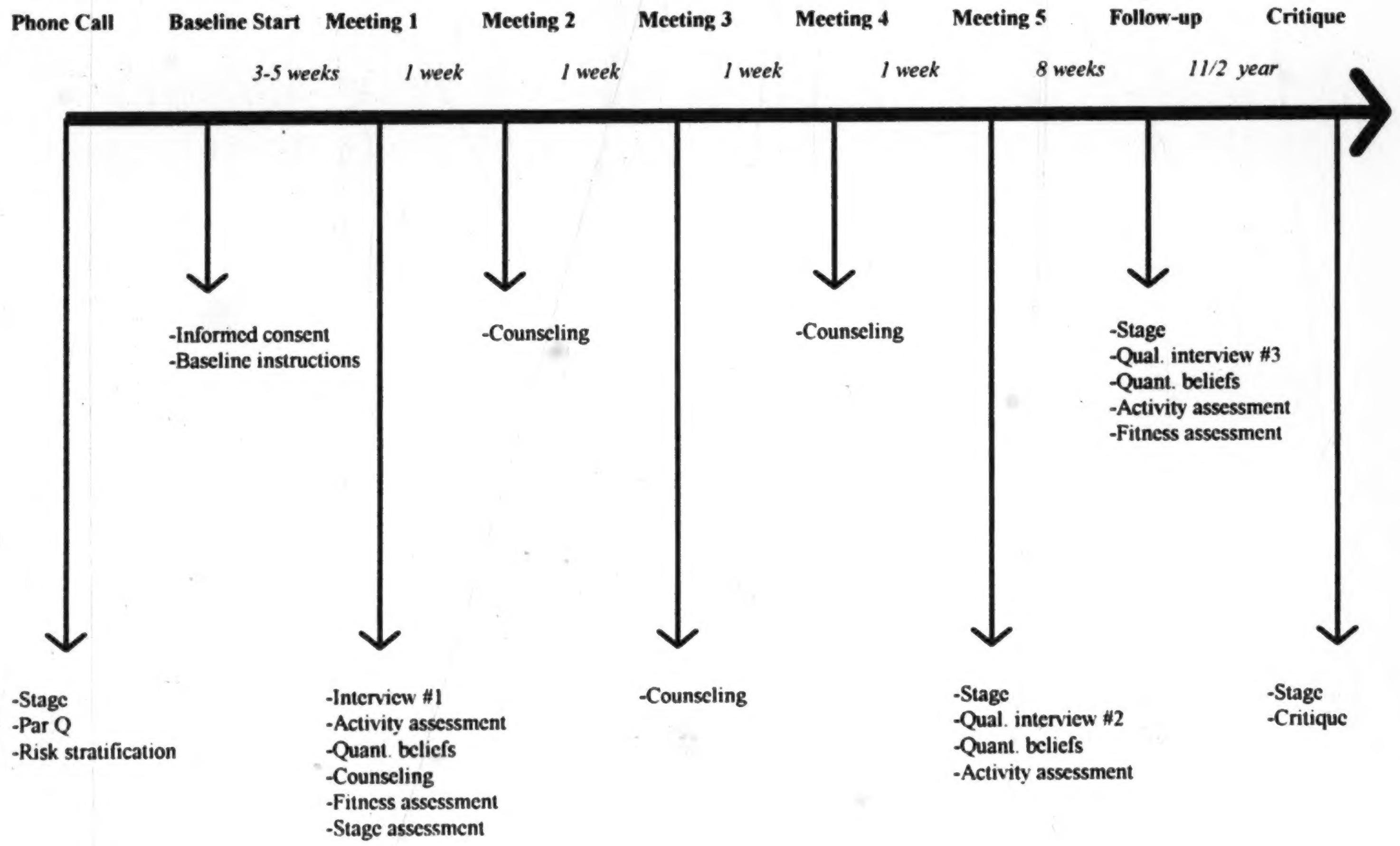
Overview

Data were gathered prior to, during and following the intervention in a manner consistent with the description for Study One (pp. 37-40). An overview and timeline for the measures, data gathering and intervention are provided in Figure 2.

Data Gathering

A combination of qualitative and single-informant methodologies allowed detailed examination of the intervention and its influences. This in-depth, individualized perspective encouraged examination and separation of the influences of behavior change strategies, attention from a counselor, social support and reinforcement. To facilitate this examination of individual behavior, originally it was planned to employ both a changing-

Figure 2
Timeline for Study Two


Phone Call
Baseline Start
Meeting 1
Meeting 2
Meeting 3
Meeting 4
Meeting 5
Follow-up
Critique
3-5 weeks
1 week
1 week
1 week
1 week
8 weeks
11/2 year
-Stage
-Par Q
-Risk stratification
-Informed consent
-Baseline instructions
-Interview #1
-Activity assessment
-Quant. beliefs
-Counseling
-Fitness assessment
-Stage assessment
-Counseling
-Counseling
-Counseling
-Stage
-Qual. interview #2
-Quant. beliefs
-Activity assessment
-Stage
-Qual. interview #3
-Quant. beliefs
-Activity assessment
-Fitness assessment
-Stage
-Critique

criterion and multiple-baseline within-subject research design in conjunction with intensive qualitative interviewing (Kazdin, 1982) (see Appendix G). Problems encountered in implementing the single-subject methodology necessitated a revision of these plans. Informants failed to comply with activity criterion set by the counselor, had difficulty reporting frequency, intensity or duration of physical activity, or had unstable baseline reports of activity. These problems limited the application of changing-criterion and multiple-baseline designs. In large part the quantitative data were added to the qualitative information in carrying out a series of case studies of individuals at different stages of change. This quantitative data provided valuable collateral information on each subject and provided for interpretations relative to measurement of physical activity and research methodology.

The qualitative research methods incorporated ethnographic interviewing and then content analysis. Three interviews were conducted with each informant to gain insight into their behavior, attitudes, beliefs and stage of change. The interviews were conducted prior to initiating the intervention, immediately following it and eight weeks post intervention. Information provided by informants on counseling effects was summed from the three interviews with no comparison between interviews. The same process was followed for the advice provided by informants for others. In contrast attitude and beliefs were examined by looking at changes in instrumental and affective attitudes as well as control and normative beliefs across the range of the three interviews. In this way change in attitude and beliefs were examined over time. The qualitative data gathering procedures are described in more detail in Study One (pp. 37-40).

A complete outline of the questions is included in Appendix A. The major addition to the qualitative interview structure in this second study was the additional attention to measurement of total and comprehensive physical activity. A description of these measures is provided in the measures section of this chapter.

In addition to the purely qualitative methods, two measurement instruments were included in each interview. Stage of behavior adoption was determined by rating the individual, as suggested by Marcus, Rakowski and Rossi (1992) (see Appendix E). As well attitudes and beliefs were assessed at three points using a short modified version of the Ajzen and Driver (1991) scale as described in study one. This modified scale is a belief-based measure of attitude (see Appendix B).

In this study physical activity was monitored by counselor supported self-report, as recommended by Sallis, Haskell, Wood, Fortmann, Rogers, Blair and, Paffenbarger (1985). This technique combines self-report with a structured interview designed to facilitate better recall of the week's activity. Physical activity was broadly defined for the second study based upon the interpretation of Study One. Physical activity comprises any body movement produced by the skeletal muscles that results in a substantial increase over resting energy expenditure (Bouchard & Shephard, 1994). Within this general category of behavior a number of further distinctions are made. For example, physical activity was sub-divided into occupation related physical activity, leisure time physical activity and activities of daily living. Another classification approach divides overall activity according to the intensity of activity. Very hard physical activity consists of activities such as jogging or swimming. Hard activities would include things such as fast dancing or tennis doubles. Moderate activities would be represented by activity such as golfing without a cart or brisk walking (Sallis, Haskell, Wood, Fortman, Rodgers, Blair & Paffenbarger, 1985).

One year following completion of the final interview each informant was asked to critique a focused review of the three interviews in which they participated (see Appendix H). The review concentrated on three areas of informant perception: 1) the intervention effects, 2) attitudinal effects and 3) advice for others. The informants were asked to review the results and then to note any discrepancies, omissions, additions, or comments. They were also asked to note their degree of agreement with the review of these three areas of concentration. At the time of this follow-up the physical activity level of each informant was revisited with the stage of change questionnaire and descriptive questions about their current physical activity level. Revisiting each informants' activity level provided a snapshot of their long-term physical activity level.

Informants

Informants were recruited volunteers from the faculty and staff of a large western Canadian university . The sample frame was comprised of all individuals who were listed in the University of Alberta, Telecommunications Directory, but was immediately limited to males between the ages of 35 and 55. Prior to their involvement each informant was asked to complete an informed consent form for their participation in the study. (See Appendix C). Risk stratification of each informant was completed to purposefully select only apparently healthy males (ACSM, 1991, p. 5-10). As this was the initial application of this intervention for the later stages of change, the informants were recruited from a convenient population. Qualitative inquiry was facilitated by the investigator's familiarity with the population and the workplace. To generalize the findings of this study the intervention should be applied to diverse populations in a variety of settings. For example it has been suggested that strategies of motivation are gender specific (Marcus, King, Clark, Pinto & Bock, 1996). As this was the second application of this intervention in a series, the informants were recruited from a similar convenient population to the one used for application to the early stages of behavior change. This ensured consistency through application to all stages of behavior change. The sampling was purposeful in that it gathered informants who fit into the stages of interest and who were apparently healthy. The initial telephone call provided informed consent, determined the stage of readiness and searched for volunteers in each of the three stages for continued participation. The proactive approach was used to contact possible informants from all stages, although this manner of collection is most appropriate for the early stages (Prochaska and Marcus, 1994). Because no harm was done by collecting informants in this manner, it was continued for this study after its use for a study examining counseling of individuals in the earlier stages of behavior change. Telephone calls initiated contact searching for volunteer participants for inclusion in a four session counseling program. The telephone interview determined the stage of readiness for physical activity behavior change. Following their stage classification, informants were asked if they would be willing to participate in the counseling program. The calls continued until three informants were recruited for each of the preparation, action and maintenance stages of readiness. During the progress of the intervention two informants in the active stage became ill and halted their participation in the study. One of the informants was replaced while the second was allowed a period of convalescence and continued his participation in the study. An extended description of each individual who participated in this study was provided within the individual informant results.

Intervention

The intervention was designed to provide flexible and effective physical activity counseling to individuals in the preparation, action and maintenance stages of physical activity behavior. Its goal was to develop and support attitudes, beliefs and behaviors which would ingrain regular physical activity as part of a healthy lifestyle. A face-to face individual clinical counseling intervention was chosen over such options as group, telephone, or computer-based interventions so as to better match the underlying theoretical assumptions. The short-term counseling (Janis, 1983) and motivational interviewing (Miller & Rollnick 1992) models were both developed as individual counseling approaches.

The intervention was designed to set up the conditions to ease progress toward the initiation and eventual maintenance of physical activity. It was anticipated that counseling attention to both beliefs and behavior would help ingrain regular physical activity patterns for people in the latter three stages of change. The development of stage specific actions was based on the review of clinical interventions and the theory regarding stage specific counseling (DiClemente, 1991; Marcus, Taylor & Simkin, 1992; Naylor & Simmonds, 1994; Naylor & Wheeler, 1995; Pace Manual, 1992; Rollnick, Heather, Gold & Hall, 1992; Squamish, 1990).

Each counseling intervention consisted of four sessions, with the initial session involving the development of rapport as outlined in Study One. During the initial session a qualitative interview was conducted then questionnaires, forms and participation were completed. A fitness evaluation was conducted during the second session and then repeated at the time of the eight-week follow-up. Three counseling sessions followed the initial contact. These three sessions addressed the counseling needs of people in preparation, action and maintenance. For those in preparation the focus was on building commitment. For those in the action stage the focus was on implementing a plan of action. For the informants in the stage of maintenance the focus was on entrenching their pattern of behavior and avoiding relapse. The specific actions are outlined in Table 11.

The counseling intervention was altered from the original proposal based on previous work with individuals in precontemplation, contemplation and preparation. During that previous research a detailed, multifaceted method of measuring physical activity behavior was piloted. This method was integrated into the study of later stage counseling as both part of the intervention and as an evaluation of behavior change. Interpretations of the previous research suggest that changes occur in various levels of physical activity behavior. In that light the investigation paid attention to changes in activity along the spectrum from active living to structured exercise. Such changes should not be disregarded but, to the contrary, should be integrated as part of the process of adopting and maintaining regular physical activity demonstrated to contribute to a healthy lifestyle.

Table 11
Session Concentration for Counseling

STAGE	*SESSION*	*ACTION*
Preparation	One	Establish rapport (J, M&R); complete interview, questionnaires & forms.
Preparation	Two	Provide further support for pros & benefits, review personal reasons to be active (M&R, P&D), assess fitness.
Preparation	Three	Work to strengthen commitment, anticipate barriers & develop coping skills, explore obstacles and their solutions, fitness feedback (M&R, P&D).
Preparation	Four	Develop continued action plan, help client plan, set dates goals and objectives (J, M&R, P&D).
Action	One	Establish rapport (J, M&R); complete interview, questionnaires & forms.
Action	Two	Review benefits & rewards, plan ways to overcome obstacles (M&R, P&D), assess fitness.
Action	Three	Provide relapse prevention training & methods to deal with lapses, identify social support, example successful models, fitness feedback (M&R, P&D).
Action	Four	Support confidence & self efficacy, plan for continued progress, outline rewards (J, M&R, P&D).
Maintenance	One	Establish rapport (J, M&R); complete interview, questionnaires & forms.
Maintenance	Two	Reemphasize benefits, request information, assess fitness, explore success & failure (M&R, P&D).
Maintenance	Three	Provide feedback & requested info, fitness feedback, relapse prevention training (M&R, P&D).
Maintenance	Four	Review both short & long-term goals, support maintenance, redefine & add program variety (J, M&R, P&D).

1. Key for Table: Major references for the intervention components. J = Janis, 1983, M&R = Miller and Rollnick, 1991, P&D = Prochaska and DiClemente, 1984
2. Additional information for counseling specific to each stage of change is contained in Appendix F.

Measures

During the initial telephone interview, stage of change was assessed by asking each informant to rate their current exercise behavior as estimated by one of five statements (Marcus, Rakowski and Rossi, 1992). The five rating statements are provided in Table 12. Informants were asked to select the phrase which best described their behavior. To be considered "regular", exercise was to be participated in three times per week for at least twenty minutes.

Table 12

Stage of Change Classification

Stage	*Statement*
Precontemplation	"I currently do not exercise and I do not intend to start exercising in the next six months."
Contemplation	"I currently do not exercise but am thinking about starting exercising in the next six months."
Preparation	"I currently exercise some but not regularly."
Action	"I currently exercise regularly, but I have only begun doing so within the last six months."
Maintenance	"I currently exercise regularly and have done so for longer than six months."

Attitude and belief assessment consisted of two open-ended questions directed at each of four aspects of beliefs following the procedures of Ajzen and Driver (1991). The objective was to uncover information on instrumental, affective, control and normative beliefs pertaining to physical activity. Instrumental beliefs were examined by asking the informants to discuss the perceived costs and benefits they associated with physical activity. Questions about enjoyment and displeasure associated with physical activity provided insight into affective beliefs. Control factors were examined by asking informants to provide information on the facilitators and barriers that influenced their physical activity behavior. Normative referents were investigated by asking informants to discuss the social support and social discouragement for physical activity.

Six semantic differential items were used to evaluate the informants' responses to the four constructs: affective, instrumental, control and normative beliefs. For example with the affective construct the informants responded to the following statement: "I think participating in physical activity is". They placed their mark on one of seven points between enjoyable and unenjoyable. The same general format was used to evaluate attitudes to the other constructs. The sum of the construct ratings provided a global attitude specific to physical activity.

A qualitative interview was conducted to gain additional insight into stage movement, physical activity behavior and counseling needs. In subsequent interviews this format was repeated with additional attention directed at counseling effectiveness and program refinement. The major refinement to these interviews was the addition of an individual survey of physical activity (Sallis, Haskell, Wood, Fortmann, Rogers, Blair & Paffenbarger, 1985). The interview procedure was piloted in study one. It has been supported as a reliable and valid measure of physical activity (Taylor, Coffey, Berra, Iaffaldano, Casey & Haskel, 1994; Dishman & Steinhardt, 1988; Gross, Sallis, Buono, Roby & Nelson, 1990). This assessment of physical activity included a comprehensive activity assessment and a recall of total activity. The comprehensive assessment asked informants to report their usual participation from a list of moderate activities. During the recall of total activity the counselor guided informants to recall activity over the past seven days. Recall was divided into week days and weekends. Recall was divided into activity intensities beginning with sleep then advancing through sitting, moderate, hard and very hard activity. Examples of activities in each intensity were provided to the informants prior to the interview.

Definition of fitness is relevant at this point. According to Nieman (1986), physical fitness is a dynamic state that enables one to complete daily tasks, participate in leisure time activities and meet the challenges of unplanned emergencies. In programs such as the Canadian Physical Activity, Fitness and Lifestyle Appraisal (CPAFLA), clinically significant fitness is defined as a set of health related attributes that exhibit a relationship with health status (CSEP, 1996). This definition guided the evaluation of fitness for this individual counseling intervention. The CPAFLA has been used by certified fitness counselors in Canada for two decades. The format has been upgraded several times with the most recent revision in 1996. The evaluation categorizes results according to health benefit zones ranging from needing improvement to excellent. Health related fitness evaluation is focused on body composition, aerobic fitness and musculoskeletal fitness. The use of this model of evaluation is justified for use in this project because of its long term clinical use with Canadian populations and the well established database for evaluation of health related fitness.

A review was scheduled one year following the final contact to assess stage, activity behavior and to critique each informant's specific qualitative comments.

Analysis

The qualitative data were read in an interpretive fashion rather than in a literal or reflexive fashion. This means that, as a counselor and researcher, the author constructed a version of what this data meant or represented. This construction lead to a number of interpretations of the data. Links were made between theory and practice using reasoning which allowed movement between everyday concepts, lay accounts and social science explanations (Mason, 1996, chap. 7). Rather than being limited by deductive or inductive reasoning the author attempted to make connections between informants' interpretations and social science interpretations provided by established theories. This approach suggests that theory, data analysis and data gathering are produced dialectically. This form of reasoning allows for discussion of the observations based on both the explanatory models and underlying mechanisms.

The effectiveness of the intervention was assessed through the reports of the informants and the interpretations of the counselor. These interpretations are supported by the rigor of the qualitative methods used rather than through experimental controls. The effectiveness was based on clinical interpretations, not a cause and effect relationship. The raw data obtained from each of the informant's responses to open-ended questions was transcribed from cassette to computer files. The tapes were reviewed and compared to the transcription to ensure accuracy. Content analysis was conducted on the transcribed data.

The computer files were reviewed to highlight the critical points from each paragraph. This summary of transcripts was transferred to file cards to allow for ease of sorting themes from the three interviews. Themes were analyzed to interpret data in terms of change to beliefs, as well as for similarities and differences amongst informants. A data summary for each informant was constructed from the file cards. At this point further interpretations were made based upon a review of each of the re-constructed themes. Raw data themes were identified from specific participant responses, including attitudinal changes, changes to physical activity behavior and to behaviors related to progress through the stages. The raw themes were organized into interpretable and meaningful themes (Heck & Kimiecik, 1993). The validity of themes was open to critique and confirmation with the informants. The one year post-interview critique provided this information. The stage and beliefs measures were compared and contrasted with the qualitative interpretations.

The quantitative data were interpreted based upon visual analysis of graphical representation of continuously measured behaviors (see Appendix D). Visual analysis attended to mean shift, level, trend, latency and variability of the data (Kazdin, 1982, pp. 231-239). This facilitated examining patterns across baseline, intervention and follow-up phases and identifying patterns that demonstrated a relationship between the counseling intervention and physical activity behavior. As mentioned previously the single-subject data were limited by problems in the self-evaluation of physical activity. Informants had difficulties accurately recording intensity of physical activity and did not consistently comply with the established criteria for assessing physical activity participation. These inadequacies in the quantitative data dictated that it could not be analyzed with confidence according to single-subject design techniques. Consequently, the quantitative data was largely used as additional information to support the qualitative data in a series of case studies.

Results

Introduction

The informants participated in three interviews each and completed an individual critique of the interpretations one year following the final interview. There was generally either agreement or strong agreement with the interpretations, with only limited reports of discrepancies or omissions. If additions or clarifications were submitted by the informants, they were integrated into the presentation of individual results. The individual results are crucial to the integrity of this study, which was based on the premise that previous interventions have been limited by a lack of flexibility in their design and a lack of attention to individual differences. The results that follow include a summary of each informant's individual data. For each informant, results included data on changes in the stage classification and changes in beliefs across the duration of the study. Information was also provided from the informants on how others similar to them could change their physical activity behavior. Individual results provide comments on the effects of the intervention and suggestions for improving the intervention effectiveness. Finally a critique of the individual findings was included for each informant. Following the individual results, group results are presented which identify similarities and differences between individuals in each of the three stages. This will provide the basis for discussion of individual and stage applications of a counseling intervention directed at promoting long-term, regular physical activity.

Review of Individual Informant Qualitative Data

Informant P1 (preparation)

Description

This 50 year old subject was employed in an administrative position at the university. His post-secondary education includes two undergraduate degrees. The subject completed the Par-Q evaluation reporting no reason why he could not participate in medically unsupervised physical activity.

Stage of Change Classification

During the telephone interview the subject reported that he currently exercised some but not regularly. This statement was confirmed just prior to the baseline period. This statement classified the subject as an individual in preparation for adopting regular physical activity.

Reported Intervention Effects

Prior to the intervention the informant was unsure of why he should become more active. This informant felt that the program had helped to some extent, suggesting that his attitudes have been affected and he suspected that the changes in attitude would lead to changes in behavior. He reported a more positive attitude toward physical activity with less resistance to increasing his level of physical activity. Awareness of the benefits of physical activity was one of the prominent changes influencing attitude. The informant said that he was now motivated by the awareness that physical activity would have positive effects on his health, independence and mobility in the future. His increased level of awareness and consciousness had positive effects on both his attitude and behavior. He reported being more active following the intervention. He reported doing more activity together as a family, but indicated wanting to do more even though it was getting difficult as his children are adults. He was in a physical activity class and was searching for the right environment to do additional physical activities. He was now aware that he needed to do physical activity more regularly to achieve long-term benefits. He indicated that if he was to set aside more time he would be able to continue making changes. He was advised that if he was to get to a fitness level where he felt better following physical activity, it would increase his likelihood of being active regularly. It was also suggested that more careful monitoring of his intensity would ensure that he obtained his objectives. Other facilitators that he suggested to establish a regular routine included having handy equipment and taking advantage of good summer weather. In summary the informant stated that he did not need more preparation. What he needed was to just do it.

Suggestions for Improving the Intervention

The informant felt that the counseling was too unstructured. He felt that the counseling could be more formalized and presented in a more structured and fixed format. The program should help to select the best activities to match the needs of an individual. In other words, the counseling program should be tailored to achieve the informant's expected benefits and needs. It may be possible to present the program with an audio-visual presentation or on computer. The program should talk about the key factors that influence activity and the current thinking on benefits. He felt that it would help to introduce informants to activity in a fitness centre and provide them with a complimentary promotion package. The program could be improved by concentrating on more than the physical being, giving attention to the total well-being of the informant. Using heart-rate monitors might be a good motivational tool. The program would be better if some of the repetition of questions was reduced. For those who were more active the repeated questioning may be detrimental to the program effectiveness.

Reported Attitude and Belief Effects

Instrumental Attitude

Following the intervention and at the time of the follow-up evaluation, there was not a large change in this informant's perceived costs of physical activity. The costs reported varied across the three interviews. Some of the reported costs included preparation and clean-up time, boredom and stale environments. It was reported during the final interview that there were really no significant costs to physical activity. Early in the study, this informant recognized such benefits as health, socialization and the pleasant environment in which to be active. One significant change to reported benefits was the extension of active years of life. He stressed the benefit provided by physical activity was allowing more productive years and more years to enjoy oneself.

Affective Attitude

The attitudes relating to enjoyment were maintained throughout the length of this study. Following the intervention the informant recognized the importance of finding benefits on several levels. At that juncture he was able to more clearly pinpoint some of his sources of enjoyment. He recognized benefits directly connected to moderate physical activity including feelings of satisfaction, being in the environment doing physical activity and the variety of physical activity. This informant's report of dislikes was increased immediately following the intervention. He concentrated on his dislike of intensely organized activity. Following the intervention he seemed to come to the realization that moderate activity in pleasant environments was enjoyable but he did not enjoy many of the impositions of physical activity. Such impositions included preparation time and organization. During the follow-up interview his comments on dislikes were reduced and less descriptive. At that point he clearly stated that he did not enjoy boring or repetitive activity and did not like activity that took place in unpleasant environments.

Control Beliefs

In general there was little change in this informant's perception of facilitators of his physical activity. He did focus more during the follow-up interview on personal facilitators such as feelings of well-being and his personal interest in aerobic fitness as a means to improve his lifestyle during retirement. Following the intervention, this informant became more specific with respect to perceived barriers. He began to focus on specific facilitators such as social support, pleasant locations, or programs where he could participate in physical activity. He moved from general comments such as his lack of motivation to a focus on what he enjoyed and what he did not. He discussed how the weather interfered and was considering how to overcome such barriers.

Normative Beliefs

Following the intervention and during the follow-up interview this informant recognized more social involvement. He noted increases in family support, involvement and level of physical activity. The support was not strongly verbalized by his family but was perceived by the informant. There was no report of social discouragement during the initial or post-intervention interviews. During the follow-up interview the informant recognized that there would be a level of physical activity that his family would discourage, but he was not planning to overdo his activity.

Reported Individual or Situational Influences

Following the intervention this informant shifted his focus from a combined individual and situational focus to a focus stressing the individual barriers. He concentrated on factors related to his personal attitudes, finding a balance in his life. He believed that he needed to increase his commitment to physical activity and the benefits he could achieve. The informant had difficulty commenting on individual and situational barriers when he critiqued the interpretations. In continued counseling this area could be explored further.

Reported Advice for Others

This informant stressed the importance of appreciating the long-term and daily benefits associated with physical activity. By long-term effect he implied that independence was maintained through physical activity. Those who avoided the drifting away from physical activity as they aged would be able to maintain other activities they enjoy. He suggested that it was important for those beginning physical activity to find something they enjoyed. As the study progressed this informant expanded his suggestions to help others begin physical activity.

Informant's Independent Critique

This individual remained in preparation one year following his final interview. He had moved along the stage continuum immediately following the intervention, indicating that he was part way to action due to increases in activity and changes in his attitude. He continued to follow his usual pattern of physical activity in fitness classes two times per week from September to March. He was now spending more time outdoors walking and cycling but not strenuously. He reported that his physical activity was about the same as prior to the intervention. Although he did not report substantial changes in how he valued physical activity, or its integration into his daily life, he still valued physical activity but was not motivated to do strenuous activity. He was satisfied with his pattern of recreational activity.

In general this subject agreed with the interpretations of his qualitative interviews. He had difficulty comprehending the interpretations relative to his comments on individual or situational barriers that affected his activity participation. In reflection he suggested that the program was more monitoring and guidance rather than a true intervention. This reflection may suggest that he may have been looking for a more directive approach. He was looking for the right opportunities for him to become more active. He had been motivated by his wife's interest in physical activity, but her motivation had dropped off. The increased social involvement with his family due to physical activity was brief. He had been motivated to exercise as a means of controlling his cholesterol. His cholesterol levels were not controlled by the activity he was doing so he was now on a cholesterol lowering medication. His major motivation for participation in physical activity remained the value he placed on activity to prevent physical restrictions as he aged.

Reported Physical Activity

This informant provided information on his physical activity in two ways. He responded to the comprehensive activity assessment which asked him to identify his regular participation in several activities categorized as moderate or vigorous. He participated in an interview to determine total physical activity. Prior to the interview he was given a handout which provided examples of moderate, hard and very hard activities. The interview broke down his week to rate his involvement in activity for the previous week. The results of these measures of physical activity are presented in Table 13.

Table 13 Comprehensive and Total Physical Activity for Informant P1

Measurement	*Pre-intervention*	*Post-intervention*	*8-week Follow-up*
Comp. Moderate	2 activities	4 activities	3 activities
Comp. Vigorous	0 activities	0 activities	0 activities
Total Sleep	52.5 hours	53.5 hours	42.5 hours
Total Sitting	94.0 hours	94.0 hours	112.0 hours
Total Light	20.0 hours	17.0 hours	13.5 hours
Total Moderate	1.0 hour	3.0 hours	0.0 hours
Total Hard	0.5 hour	0.5 hour	0.0 hours
Total Very Hard	0.0 hours	0.0 hours	0.0 hours
Rate Activity *	less	more	less

* Comparing the last week to the previous three months.

Both the comprehensive and total report of activity suggest that moderate physical activity was increased following the intervention while vigorous activity was consistent prior to and following the intervention. Although the comprehensive assessment indicated that moderate activity remained elevated to some extent eight weeks following the intervention, the recall of total physical activity did not support the increase. The subject indicated that he was traveling that week which disturbed his normal sleep and activity patterns in the recall week. Light activity demonstrated a reduction. This trend may be explained by the increased time spent sitting due to the disruption in his normal activity pattern.

Fitness Measures

The complete results of the initial and follow-up fitness assessments are summarized in Table 14. No health benefit zones demonstrated a negative clinical change.

Table 14 Fitness Assessment Summary for Informant P1

Component of Fitness	***Initial Assessment***		***12 Week Follow-up***		***Change***
	Score	Health Zone	Score	Health Zone	
Weight (kg.)	79.6	NA	79.9	NA	↑ 0.3
Height (cm.)	187.0	NA	187.0	NA	=
Waist (cm.)	87.0	H	87.0	H	=
BMI (kg./m.^{2})	22.8	H	22.8	H	=
Skinfold Sum (mm.)	45.0	H	46.2	H	↑ 1.2
Trunk Skinfold (mm.)	22.5	H	22.8	H	↑ 0.3
Resting HR (bpm.)	67	NA	69	H	↑ 2
Resting BP (mm.hg.)	124/90	NA	120/85	NA	NA
Aerobic Fitness (pts.)	453	VG	452	VG	↑ 1
Grip Strength (kg.)	108	VG	117	EX	↑ 9
Push-ups	17	VG	19	VG	↑ 2
Trunk Flexion (cm.)	26	G	35	EX	↑
Partial Curl-ups	22	VG	25	EX	↑3
Leg Power (kgm./sec.)	113.9	EX	107.2	EX	↓ 6.7

Key: NA = Not Applicable, EX = Excellent, VG = Very Good, G = Good, F = Fair, NI = Needs Improvement, UH = Un-healthy, H = Healthy

Clinically significant changes in fitness in this informant were indicated by changes in the health benefit zone as noted in the Canadian Physical Activity, Fitness and Lifestyle Appraisal, (1996). On the initial assessment no health risk was indicated. This informant improved his grip strength, trunk flexion and curl-ups in the 12-week period between his initial fitness assessment and the follow-up. These changes demonstrate improvement of upper body strength, muscular endurance and general flexibility.

Informant P2 (preparation)

Description

This 36 year old male subject was a staff member at the university. He has completed a post-secondary undergraduate degree. His Par-Q evaluation indicated some problem with sore knees and a hiatus hernia. He has never been told that he should not participate in physical activity without medical supervision.

Stage of Change Classification

During the initial telephone interview this subject reported that he was currently exercising some but not regularly. This classification was confirmed just prior to the baseline period. The subject was therefore classified in preparation for adopting regular physical activity behavior.

Reported Intervention Effects

This informant began the intervention with a good knowledge of the benefits of physical activity but had several concerns about body image and the way people would view him when he was beginning physical activity in public. Prior to the intervention the informant stated that he needed someone to oversee his program and that he needed to be convinced of the benefits of regular exercise. He was looking for someone to develop a specific plan for him to do in the gym. The informant moved into action following the intervention and remained there when he completed the stage assessment during the eight-week follow-up. This informant was confident following the study that he could remain active. He has made physical activity a goal after noticing both physical and mental changes. He was considering doing even more physical activity. Following the intervention this informant felt that the counseling had made an enormous difference to him. He began to realize that activity could be done for its own enjoyment rather than just being a chore. He felt that during the intervention he removed many stereotypes that he had. He felt that having weekly reinforcement helped him get started. The weekly goal setting helped. He felt that individual counseling made his activity self-sustaining. He had synthesized the ideas into his attitude and was now looking for reasons to be active rather than excuses not too. Although he knew some of the information prior to the intervention, he felt that the information was reinforcing and did not interfere with his progress or distract him. After the eight-week follow-up, he was still in action. Additional comments on the intervention indicated that during the intervention he had removed many barriers to his activity and had included many things in activity that he really enjoyed. He diversified his activity and now felt he was looking for activity rather than looking for excuses to avoid it. At times he felt that activity was a bit intense for him but at those times he went at a lower pace. This difficulty did not discourage him with his new attitude towards activity. The informant suggested that he now felt that others' opinions of him were not really important to him. He knew what he wanted and was working toward his goals. This informant progressed from dealing with some initial barriers to planning to make specific changes and finally to implementing changes. At the time of follow-up he planned to further diversify his physical activity and recreation. At that time he was searching for winter activities to prevent relapse from physical activity.

Suggestions for Improving the Intervention

The counseling program matched the needs of this informant well. He suggested that others may need more direct attention to physical activity skills. He felt that repetition was reinforcing, not distracting. The aerobic fitness evaluation was difficult but did not discourage the informant. Rather his poor performance served to motivate the informant to work harder to improve his condition. He suggested reducing some of the pressure to walk fast every time he was commuting to work and to simplify the recording sheets. This informant appreciated the individual attention to his behavior change and believed that in his case a group program would not have been as effective.

Reported Attitude and Belief Effects

Instrumental Attitude

This informant reported a gradual reduction in his perceived costs of physical activity. Prior to the study and following the intervention time conflicts with other activities were the major costs reported. This effect was reduced to a low significance following the intervention and during the follow-up interview it was considered to be very slight. These changes reflected the gradual reductions in perceptions of costs during the length of the study. Coming into the study this informant had a good knowledge of mental and physical benefits. He noted additional benefits he had discovered during the intervention. Some of these additions included cognitive alertness, feelings of wellness, feeling better on active days, increased enjoyment of a variety of physical activities and the ability to do other activities without negative effects.

Affective Attitude

Originally this informant's enjoyment was tied to a few specific activities such as walking and competitive sports. Following the intervention he reported feelings of enjoyment and satisfaction with his achievements and the feelings associated with his increases in physical activity. He continued to be motivated more by the expectation of results than by the activity itself. He continued to enjoy sport, competition and now enjoyed the individual changes he had made. This informant minimized to a great extent the negative attitudes related to beginning physical activity. He had resolved to ignore others who discouraged his participation. He was no longer fearful of participating in physical activity in public. He still disliked the tedious nature of some physical activity and getting up early to participate in physical activity.

Control Beliefs

The facilitators for this informant advanced from needing to start a regular routine prior to the intervention to experimenting with integrating physical activity into his life following the intervention. The progress continued with the informant continuing to seek a balance between physical activity and other demands on his time. In addition to this search for balance, at the time of the follow-up, the informant had taken action steps such as obtaining a convenient club membership at his workplace fitness centre. Prior to the intervention this informant had several barriers associated to his attitudes about his physical self. He was self conscious about working out in public and concerned about his lack of fitness. Following the intervention and into the follow-up period the barriers of self consciousness and body image were reduced. The barriers that remained were adapting to the demands of family life and work.

Normative Beliefs

Social encouragement was perceived by this informant throughout the duration of this study. His spouse and son were consistent sources of support. His wife provided encouragement and his son enjoyed participating in activity with his father. The discouraging atmosphere of gyms was overcome by this informant following the intervention. He coped well with his feelings of self-consciousness, recognizing that discouragement from others whom he did not know was not important to him. He was less concerned about his state of fitness and was enjoying physical activity. He did not feel direct disapproval at work but noted that he felt pressure to be at work more.

Reported Individual or Situational Influences

Throughout the study this informant placed more importance on the individual barriers to his being physically active. He did note situational things such as his schedule but reiterated following the intervention and again during the follow-up that his physical activity was to the greatest part dependent on his personal efforts to adapt his schedule. In summary he felt that situational factors could be overcome by his internal drive.

Reported Advice for Others

This informant was hesitant to give advice to others until he felt in better condition. He suggested that an effective technique might be to take on activities they already do and habitualize them. People who are planning to increase their activity need to be convinced of the benefits. He would challenge individuals and suggest to them that they examine their barriers and plan to break them down or plan to get around them. For those less active than himself he would offer to participate with them. He would rationalize the benefits to individuals and relate the personal experience he has obtained participating in this counseling program.

Informant's Independent Critique

This informant agreed or strongly agreed with the interview interpretations presented in the results of this study. No discrepancies, omissions, or additions were added to the interpretations. The informant remained in the stage of action. He had lapsed from activity for a short period but had become active again for several months one year following the intervention. In terms of his control beliefs he indicated that he had more demands from an expanded role at work and his registration in a MBA program. Even with these additions to his schedule he felt a strong drive to remain active. It was a source of frustration at times, but he had the internal drive to overcome situational barriers. In terms of normative beliefs he felt more immune to social discouragement. This continued a shift in attitude he had made during the intervention. The informant reported being more active than prior to the intervention. He was cycling 11 kilometers daily during the week and 15 to 25 kilometers with his family on the weekend. He indicated that he had changed the way he valued physical activity. He now looked forward to daily activity and felt he missed something on days he was not active.

Reported Physical Activity

The results of comprehensive and total physical activity interviews are presented for informant P2 in Table 15. The most obvious change in activity was the increase in total hours of hard activity from a weekly total of one half hour up to four hours. The reported hours spent sitting was reduced between the time of the preliminary and follow-up assessments.

Table 15 Comprehensive and Total Physical Activity for Informant P2

Measurement	***Pre-intervention***	***Post-intervention***	***8-week Follow-up***
Comp. Moderate	3 activities	5 activities	2 activities
Comp. Vigorous	0 activities	0 activities	0 activities
Total Sleep	55.0 hours	50.0 hours	53.0 hours
Total Sitting	62.5 hours	57.0 hours	47.0 hours
Total Light	33.0 hours	39.5 hours	43.5 hours
Total Moderate	17.0 hours	20.0 hours	20.5 hours
Total Hard	0.5 hours	1.5 hours	4.0 hours
Total Very Hard	0.0 hours	0.0 hours	0.0 hours
Rate Activity *	same	more	more

* Comparing the last week to the previous three months.

Fitness Measures

The assessment results of this subject are summarized in Table 16.

Table 16
Fitness Assessment Summary for Informant P2

Component of Fitness	***Initial Assessment***		***12 Week Follow-up***		***Change***
	Score	Health Zone	Score	Health Zone	
Weight (kg.)	114.8	NA	118.0	NA	↑ 3.2
Height (cm.)	176.5	NA	176.5	NA	=
Waist (cm.)	121.0	UH	121.0	UH	=
BMI (kg./m.^{2})	36.8	UH	37.8	UH	↑ 1.0
Skinfold Sum (mm.)	143.8	UH	126.8	UH	↓ 17.0
Trunk Skinfold (mm.)	75.0	UH	69.3	UH	↓ 5.7
Resting HR (bpm.)	79	NA	84	NA	↑ 5
Resting BP (mm.Hg.)	118/76	NA	125/85	NA	NA
Aerobic Fitness (pts.)	465	NI	458.6	NI	↓ 6.4
Grip Strength (kg.)	96.0	NI	90.0	NI	↓ 6.0
Push-ups	5	NI	10	NI	↑ 5
Trunk Flexion (cm.)	28.5	G	31.0	G	↑ 2.5
Partial Curl-ups	15	F	18	F	↑ 3
Leg Power (kgm./sec.)	153.9	EX	158.2	EX	↑ 5.7

Key: NA = Not Applicable, EX = Excellent, VG = Very Good, G = Good, F = Fair,
NI = Needs Improvement, UH = Un-healthy, H = Healthy

Informant P2 began the study with unhealthy results on his assessment of body composition. In the follow-up assessment positive trends were occurring in body composition but his composition remained in the unhealthy classification. Although his fitness ranged from excellent to needing improvement across the components he scored poorly in aerobic fitness, upper body and abdominal strength and endurance.

Informant P3 (preparation)

Description

This 53 year old male subject has a Ph.D. degree and was a staff member of the university. He completed a Par-Q evaluation reporting some arm pain but no reason why he could not participate in medically unsupervised physical activity.

Stage of Change Classification

During the initial telephone interview this subject stated that he currently exercised some but not regularly. This statement was confirmed prior to the baseline period. The subject was classified as someone in preparation for adopting regular physical activity.

Reported Intervention Effects

In his initial interview this informant reported that his activity level dropped during the years he was completing his doctoral dissertation six years ago. His activity in team sports had been reduced over the years. Stress, the workplace and social obligations were cited as the factors contributing to his lack of activity. The informant reported being in contemplation which moved him back a stage from his reported level at the time of telephone recruitment. He felt this was a more realistic evaluation following the baseline logging of activity. The conversations during the intervention developed feelings of guilt and a commitment to be more active. These feelings of guilt were not conscious to the informant during the intervention, but were recognized and confirmed during the independent critique. He saw value in the concept of cumulating activity over the day when he found it difficult to walk a half hour straight. This informant felt there were several additional ways that the intervention had helped him. The monitoring increased his accountability. His awareness of physical activity benefits and possible activities that he could consider were increased by the counseling. The informant was disappointed that the program did not help him as much as he wanted. He was trying to increase his activity and was much more conscious of it but his behavior had not changed to the degree he had anticipated. Following the intervention he was only slightly more active than prior to the intervention. The program had caused him to reflect on his need for physical activity and increased his determination to make a breakthrough. He had begun to make mental notes to begin cycling to work in the spring and might consider starting to walk to work sooner. He had bought a pedometer which had again increased his consciousness of activity and motivated him to be more active on the days he wore it. The repetition of questions over the three interviews made him think about his answers more seriously.

Suggestions for Improving the Intervention

Following the intervention the informant suggested that the program might be improved by allowing time for real physical activity experience with the counselor. In contrast he did suggest that he would not have stuck to individual activity for the long term and would either search for team activities he enjoyed or drop back to his previous behaviors. He reemphasized his contention that he was influenced by the knowledge he gained about the benefits of cumulative activity. He suggested that this be stressed to a greater extent in future counseling. He suggested that the program was well constructed but could be streamlined. There was nothing he would remove from the program. Initially this informant felt that his commitment to the program would lead to an increase in physical activity. He admitted feeling guilty about not becoming more active. During the follow-up interview he indicated that he needed to make physical activity a priority. What he felt was needed as a follow-up to the counseling was assistance to bridge the gap between his sedentary life and an active one. Further assistance was needed for him to escape the mental trap he was in where he felt he must work rather than be involved in physical activity. He was at a point where he needed to make practical changes to increase his physical activity.

Reported Attitude and Belief Effects

Instrumental Attitude

Prior to and following the intervention this informant reported time pressure as the only real cost of participating in physical activity. During the follow-up interview the informant indicated that time pressure was not really a significant cost. Physical activity did take some energy but really did not interfere with other activities. This informant had a good understanding of physical activity benefits when entering the study. Prior to the intervention this informant perceived several benefits of physical activity. He had had a long term love of sport. He also noted physical and cognitive benefits of physical activity. Following the intervention and during the follow-up this informant greatly expanded on his perceptions of benefits of physical activity. During the follow-up he highlighted benefits from intrinsic realms such as spiritual benefits, well-being and positive feeling.

Affective Attitude

This informant expanded his perceptions of physical activity enjoyment as the study progressed. He moved from expressing his enjoyment of specific activities and environments to developing his thoughts on the intrinsic benefits and nature of physical activity. He mentioned enjoying the playfulness, spirituality and sheer exhilaration of participation in physical activity. During the follow-up interview this informant reflected on his desire to seek physical activities that could provide these intrinsic benefits. There was little reduction in the dislikes expressed by this informant across the study period. He expressed different dislikes during each of the interviews. In summary he did not like solitary repetitive activity, unhealthy competition, or overly organized sport.

Control Beliefs

This informant began the study feeling that he needed to make commitments to facilitate his change in physical activity behavior. Following the intervention he began to talk more about concrete planning to begin activity. During the third interview he expressed specific facilitators and plans to become more physically active. His major facilitator at that point was to build in convenience to make physical activity more realistic for him. He noted that he still had to break down the attitude that he could not use his time for personal benefits. He was considering ideas to manage his time more effectively. His initial barriers to doing physical activity were from time pressure, difficulty finding team activities and priorities. During the follow-up interview he expanded on his discussion on barriers. He concluded that he was restricted by an unhealthy attitude toward the use of his time. He was tending to discourage himself from doing things that he had enjoyed in the past. He was falling back on excuses such as his preoccupation with work, the cold weather and the difficulty getting back into sports when he was out of shape. He had not overcome the barriers that were limiting his physical activity.

Normative Beliefs

During the initial interview this informant reported limited support for his participation in physical activity. He also reported that activity with his children was encouraging to him. Following the intervention and during the follow-up the informant indicated that the support he received from his wife was support in words more than in action. He felt the support was abstract. He was encouraged to be active but support was limited if physical activity interfered with their social activities. His support at work came from students and his committee. The workplace seemed to provide support but he seemed unsure as to how solid the support was. He often felt he was pressured to spend all his time working to support the relevance of his position. In the first interview the informant indicated that he felt his workplace had a negative influence on his physical activity. By the follow-up interview he was unsure of his level of support at work. He felt that most of his discouragement was internal. There was no overt discouragement from others. He knew he should be more active, but when he had tried ideas like walking to work he did not perceive support from significant others.

Reported Individual or Situational Influences

Prior to and following the intervention this informant believed that the barriers he had to overcome to increase his physical activity were a mixture of individual and situational factors. This perception changed according to his follow-up interview. At that point he indicated that it was mainly individual barriers that restricted his physical activity.

Psychological blocks were holding him back from doing the physical activity he was capable of.

Reported Advice for Others

This informant provided suggestions for those wishing to increase their physical activity. He expanded the suggestions as the study progressed. He initially suggested making commitments, setting aside time and finding an exercise partner. During the follow-up the informant's suggestions were closely related to his personal facilitators. At that point he suggested that individuals join active clubs, try team sports and find activities that were close to home, convenient and enjoyable. For those less active than himself he stated that he would offer personal support and encouragement, but only if they requested help.

Informant's Independent Critique

One year following the final interview this subject was in the stage of action. During the intervention and follow-up period he had regressed into contemplation but had moved into preparation following the intervention. He reported being in preparation again during the follow-up interview. His move into action was supported by reports of increased physical activity of various intensities. He was walking for 30 minutes a minimum of four times per week. In addition he was cycling in the river valley for approximately 25 minutes per week. He was supplementing his aerobic activity with muscular activities, stretching, doing sit-ups and push-ups for 10 minutes every morning. He had increased the value he placed on physical activity and was integrating physical activity into his daily life in several ways. These included replacing some of his sedentary hobbies with more active ones, parking further away in parking lots, taking stairs and walking to stores, or the mailbox.

Some aspects of his attitude were reported to have changed in the year following the counseling contact. He noted more social support for physical activity especially in the work-place. He believed that positive support for his work had contributed to his new motivation to increase his physical activity as a way to obtain new energy and stamina. He was now acting on his convictions and was experiencing benefits such as enjoyment of physical activity. In terms of control he felt that he had become more organized and in control of his time. He enjoyed being up early in the morning and was able to get some activity early in the day. He felt that one thing that made physical activity easier and more enjoyable for him was the integration of activity into his daily pattern in practical ways. Walking to work and walking the dog had increased his physical activity. He was able to integrate active social activities with students within the university community, as part of his work.

Reported Physical Activity

Informant P3 reported an increase in moderate activities in the comprehensive interview. This report was supported by the report of total moderate activity which increased from four and one half hours up to 17 hours per week. Other notable changes included a large reduction in the weekly total of time sitting with corresponding increases in light activity. There was a temporary increase in hard activity following the intervention which relapsed by the follow-up interview. The results of this informant's interview regarding physical activity are summed up in Table 17.

Table 17 Comprehensive and Total Physical Activity for Informant P3

Measurement	*Pre-intervention*	*Post-intervention*	*8-week Follow-up*
Comp. Moderate	4 activities	6 activities	6 activities
Comp. Vigorous	0 activities	0 hours	0 hours
Total Sleep	42 hours	44.5 hours	44.0 hours
Total Sitting	98.5 hours	54.0 hours	53.0 hours
Total Light	22.5 hours	43.5 hours	53.0 hours
Total Moderate	4.5 hours	17.0 hours	17.0 hours
Total Hard	0.5 hours	9.0 hours	1.0 hour
Total Very Hard	0.0 hours	0.0 hours	0.0 hours
Rate Activity *	less	more	same

* Comparing the last week to the previous three months.

Fitness Measures

A complete summary of fitness evaluations is provided in Table 18. The body composition results indicated a health concern throughout the study for informant P3. Several components demonstrated clinically significant improvement. The informant moved to more healthy zones in terms of aerobic fitness, pushups, trunk flexion and leg power. His partial curl-up scores demonstrated a negative change moving from an excellent result to the very good zone. This result indicates that more work is needed to improve abdominal muscular endurance. Grip strength, skinfold and body weight demonstrated negative changes but the changes did not fall within what would be considered clinically significant for the Canadian Physical Activity and Lifestyle Appraisal (1996).

Table 18 Fitness Assessment Summary for Informant P3

Component of Fitness	*Initial Assessment*		*12 Week Follow-up*		*Change*
	Score	Health Zone	Score	Health Zone	
Weight (kg.)	90.6	NA	92.0	NA	↑ 1.4
Height (cm.)	177.0	NA	177.0	NA	=
Waist (cm.)	99.0	UH	98.0	UH	↓ 1.0
BMI (kg./m.^{2})	28.9	UH	29.4	UH	↑ 0.5
Skinfold Sum (mm.)	64.3	UH	67.3	UH	↑ 3.0
Trunk Skinfold (mm.)	37.9	UH	40.9	UH	↑ 3.0
Resting HR (bpm.)	80	NA	80	NA	=
Resting BP (mm.Hg.)	122/90	NA	120/92	NA	NA
Aerobic Fitness (pts.)	374.7	NI	417.3	F	↑ 42.6
Grip Strength (kg.)	118.0	EX	116.5	EX	↓ 1.5
Push-ups	20	VG	22	EX	↑ 2
Trunk Flexion (cm.)	25.5	G	30.0	VG	↑ 4.5
Partial Curl-ups	25	EX	18	VG	↓ 7
Leg Power (kgm./sec.)	91.1	G	96.4	VG	↑ 5.3

Key: NA = Not Applicable, EX = Excellent, VG = Very Good, G = Good, F = Fair, NI = Needs Improvement, UH = Un-healthy, H = Healthy

Informant A1 (action)

Description

This subject was a 45 year old faculty member of the university. His highest level of post-secondary education was completion of a Ph.D. The subject completed a Par-Q evaluation reporting some minor problems with his knees. He reported no reason why he could not participate in unsupervised physical activity.

Stage of Change Classification

During the initial telephone interview the subject reported that he was participating in regular physical activity but had only begun doing so within the last six months. This was confirmed prior to the baseline period. The subject was classified as an active.

Reported Intervention Effects

This informant indicated that he was currently less active than he had been earlier in his life. The decrease in activity was due to time spent with family and increasing work demands. Prior to the study the informant had no specific expectations of the counseling. He was just looking for something that would work to increase his physical activity. The informant was classified in the action stage at the time of his telephone recruitment. At the time of confirmation of this stage, following the baseline evaluation of physical activity the informant rated himself in precontemplation. At that point the informant was disillusioned by the realization that he had become very inactive. In essence there was a gap between his perceptions of activity versus his actual activity. Following the intervention this informant classified himself as in the action stage. This classification was maintained following the eight-week follow-up period. According to this informant this program definitely helped. He felt that after the counseling sessions and a check-up by his physician he was able to increase his physical activity. During the intervention he became aware of what implications inactivity would have on his long term health. His fitness evaluation pointed out the strengths and weaknesses. This informant was challenged by the fitness evaluation to do better next time. He felt that he was still healthy but saw from the evaluation that his fitness was slipping. He felt it was time to reverse some of the trends before his health deteriorated. He decided to make changes in his lifestyle now rather than later when changes would be more difficult to achieve. One of the main factors that affected his activity was finding an appropriate time to be active. He found the early mornings on weekends and a few evenings on weekdays as appropriate times which seemed to be working well. The encouragement convinced him to do something about his trend to becoming overweight. Overall the program was judged to be highly effective by this informant. He was able to set goals and learned how to evaluate them. At the time of the follow-up this informant was cross-country skiing three times per week and was searching for activities to continue his progress as the seasons changed and prior to the cycling season.

Suggestions for Improving the Intervention

This informant emphasized the importance of keeping the program flexible. He believed that the success of the program was due to the fact that it asked people to identify why they were inactive. Without preconceptions it was then flexible with the intervention. It might promote continued motivation if fitness evaluations were scheduled every month or two to keep the sense of responsibility going. This informant found the logging of activity difficult and had difficulty recalling activity from the previous week. Many of the questions were too subjective when he was trying to be objective. He had trouble measuring his target heart rate, for which monitors might have provided assistance. To continue his successful change this informant felt that he needed to bridge the gap between seasons. Now that he had established summer and winter activities he needed to find more vigorous activities to supplement his two activity choices.

Reported Attitude and Belief Effects

Instrumental Attitude

Prior to the intervention this informant noted time conflicts, physical pain, preparation and clean-up times as the costs of physical activity. Following the intervention the informant perceived no real costs of physical activity. During the follow-up interview the informant perceived only time commitment as a cost of physical activity. There was a major reduction in perceived costs over the length of the study. This informant began the study with a good knowledge of benefits associated with physical activity. He recalled several benefits from past activity. Several of the benefits he initially reported were intrinsic in nature. The perception of benefits was maintained throughout the study.

Affective Attitude

This informant reported that he enjoyed activity as an end in itself. He did not have any reported change in enjoyment during the study. Several dislikes were reported by this informant. The dislikes were activities associated with the activity rather than the activity itself. There was little change in this attitude during the duration of the study.

Control Beliefs

The facilitators reported by this informant became more clear during this study. The facilitators became more realistic following the intervention. During the follow-up interview he reported that his activity had been facilitated by finding a time convenient for his physical activity, that had only minor impact on his family activities or work. In contrast this informant concentrated on barriers as the study progressed. Many of the initial barriers he reported prior to the intervention were removed or avoided as he became more active. As an example he did not mention time or his lack of commitment during the follow-up interview. His only remaining barrier at that time was his seasonal variation in adherence to physical activity.

Normative Beliefs

Prior to and following the intervention this informant reported that his spouse and family were supportive of him being physically active. It helped encourage him that his wife was active and that his previously inactive father has taken up activity in a big way. During the follow-up interview the informant confirmed his support but tempered his comments expressing some concern that he organized his activities in such a way as not to interfere too much with family activities. He felt that was a good way to ensure his continued family support for his individual activity. Prior to the intervention this informant indicated that he was in a leadership position at work and that he had to serve as an example to his co-workers. He seemed to imply that he did not feel comfortable taking time at work to participate in physical activity. Following the intervention and during the follow-up he reported no social discouragement from any source.

Reported Individual or Situational Influences

This informant began the study with a strong feeling that situational barriers played the major role in limiting his opportunity for physical activity. Following the intervention the situational barriers were still recognized but more weight was shifted to individual barriers. He believed that situational barriers could be overcome by strengthening the individual drive. In the follow-up he added that it was difficult to separate the individual and situational barriers. The two were interrelated and affected each other and needed to be worked on as a unit.

Reported Advice for Others

This informant made several suggestions for others trying to increase their physical activity behavior. He suggested that activity should be built into lifestyle. It simplifies activity if you build upon something you're already doing. He believed it was important to recognize the limitations of your body as you age and work within limitations. In other words, don't expect unlimited growth. Finally he highlighted the importance of getting a fitness evaluation and a medical. That information and some fitness counseling helped to maintain motivation and keep physical activity going.

Informant's Independent Critique

This subject had moved from action to the stage of maintenance one year following the final interview. This indicated that the informant had participated in regular physical activity three times per week for more than six months. He was riding his bike for approximately 70 minutes each day four to five times per week. In addition he was doing pushups, sit-ups and stretching exercises for about 20 minutes seven days a week. These specific reports confirmed his report that he was currently more active than prior to the intervention. He was active in all seasons now. This had been a problem for him in the past, as his activity was very seasonal. Cycling in the summer comprised the bulk of his regular activity. He had successfully been able to cycle in the spring, summer and fall. In what he termed "the mucky seasons" he was able to walk long distances in his workplace. He had cross-country skied regularly all winter. The major change to his attitude was that he now considered physical activity to be mandatory rather than an option.

Reported Physical Activity

This informant made the most notable change in his reports of total very hard activity. He progressed from no report of such activity prior to the intervention to six hours of very hard physical activity during his follow-up interview. This change had been a slow increase from the two hours of very hard physical activity reported immediately following the intervention. These reports of strenuous activity are supported by his report of comprehensive vigorous activity. The complete summary of his activity interviews are provided in Table 19.

Table 19 Comprehensive and Total Physical Activity for Informant A1

Measurement	***Pre-intervention***	***Post-intervention***	***8-week Follow-up***
Comp. Moderate	2 activities	5 activities	4 activities
Comp. Vigorous	0 activities	0 activities	1 activity
Total Sleep	52.5 hours	52.5 hours	56.0 hours
Total Sitting	79.0 hours	42.0 hours	84.0 hours
Total Light	28.0 hours	64.0 hours	13.0 hours
Total Moderate	8.0 hours	7.5 hours	7.0 hours
Total Hard	0.5 hours	0.0 hours	2.0 hours
Total Very Hard	0.0 hours	2.0 hours	6.0 hours
Rate Activity *	same	more	same

* Comparing the last week to the previous three months.

Fitness Measures

Several positive trends were demonstrated by this informant in regard to his fitness. His skinfold measures indicated a trend towards a healthy body composition. This was supported by a clinically significant reduction in waist girth and a reduction in body weight. Although he was in the excellent zone for aerobic fitness he continued to improve this score based on his step test performance. His flexibility was approaching a clinically significant change, demonstrating a positive trend. In terms of clinically significant changes in health zone, this informant improved his push-up score and demonstration of leg power. These changes indicate improvements in muscular fitness. A slight drop in grip strength performance dropped his zone classification from fair to needing improvement, indicating the need to work on improving upper body strength. The assessment results for this informant are summarized in Table 20.

Table 20 Fitness Assessment Summary for Informant A1

Component of Fitness	*Initial Assessment*		*12 Week Follow-up*		*Change*
	Score	Health Zone	Score	Health Zone	
Weight (kg.)	87.1	NA	85.2	NA	↓ 1.9
Height (cm.)	87.0	NA	86.5	NA	↓ 0.5
Waist (cm.)	96.5	UH	95.5	H	↓ 1.0
BMI (kg./m.^{2})	24.9	H	24.7	H	↓ 0.2
Skinfold Sum (mm.)	70.9	UH	65.2	UH	↓ 5.7
Trunk Skinfold (mm.)	48.9	UH	41.5	UH	↓ 7.4
Resting HR (bpm.)	76	NA	68	UH	↓ 8
Resting BP (mm.Hg.)	122/80	NA	125/76	NA	NA
Aerobic Fitness (pts.)	537	EX	566	EX	↑ 29
Grip Strength (kg.)	95.0	F	93	NI	↓ 2.0
Push-ups	10	F	14	G	↑ 4
Trunk Flexion (cm.)	10	NI	16.5	NI	↑ 6.5
Partial Curl-ups	25	EX	25	EX	=
Leg Power (kgm./sec.)	110.6	VG	113.6	EX	↑ 3.6

Key: NA = Not Applicable, EX = Excellent, VG = Very Good, G = Good, F = Fair, NI = Needs Improvement, UH = Un-healthy, H = Healthy

Informant A2 (action)

Description

This 37 year old male subject was a staff member of the university. The subject has obtained a post-secondary undergraduate degree. The subject completed a Par-Q evaluation reporting no reason why he could not participate in unsupervised physical activity. The subject completed a five-week baseline and one intervention meeting. He then was required to undergo medical treatment that restricted his participation in physical activity. He resumed the intervention at the point where he left off, following a brief baseline evaluation.

Stage of Change Classification

During the initial telephone interview this subject reported that he participated in regular physical activity but had only begun to do so in the past six months. This report was confirmed prior to the baseline period. He was classified as an active. The stage of change classification was to be confirmed again following his medical layoff. At that point he indicated that he had relapsed into preparation.

Reported Intervention Effects

Prior to the study this informant indicated that hoped the program would provide a fitness assessment and would provide assistance in setting up a program with realistic goals. In the past this informant had become active to improve his self-esteem and to prevent physical deterioration. Prior to the study this informant was looking to the fitness evaluation to be an eye opener. He felt it would tell him to work a little harder as otherwise he would be frustrated trying to reach his goals. This informant began the baseline evaluation classified in the stage of action. Following the baseline evaluation he was contacted to set up a time for the initial fitness evaluation. He indicated that he would regretfully have to withdraw from the project. He was scheduled to have surgery and had been told by his physician that physical activity was contraindicated. He was contacted several weeks later and asked about the possibility of reentering the project. He indicated that he was interested and a date was arranged for him to be contacted to check on his healing and readiness to reenter the program. He began the program stating he considered himself to be in preparation. He reported being in action following the interventions and again at the follow-up evaluation. During the follow-up, this informant stated that he felt that he was now truly in the stage of action indicating that he was not truly in action prior to the intervention. Logging his physical activity gave him a true picture of his activity level. One major contribution of the counseling was that it helped him come to the realization that his physical activity was sporadic. Prior to the intervention the informant felt his activity was haphazard and unorganized. Afterwards he had long and short-term goals, an objective and felt in control of his physical activity behavior. The informant reported that the counseling program helped him a lot. The program provided motivation and information. He was able to see progress which served to motivate him further. During the intervention he got in the habit of recording things and made a commitment to be active. He was made more aware of the possibilities for his physical activity. He felt that being in a program gave him a head start. It felt safer and helped develop a good plan of action. It helped mentally and emotionally if not physically.

Suggestions for Improving the Intervention

This informant did not see many additions that could have improved the counseling intervention. He suggested that he could have used assistance with alternative ways to rate his intensity of exercise as he had trouble monitoring target heart rate. In addition he felt that using monitors would have been a useful addition to a counseling program such as this. The informant did not like the tracking of heart rate intensity and felt the perceived exertion scale was too personal and subjective. For this informant to continue his change he would be looking for expanded support and an increased variety of socialization. He would like continued attention to setting measurable goals and would keep working with his wife to maintain his commitment so as to continue to progress.

Reported Attitude and Belief Effects

Instrumental Attitude

Prior to the intervention the major cost to this informant was time pressure. A secondary cost was the boring nature of some physical activities. This was repeated immediately following the intervention. During the follow-up intervention he indicated that physical activity took time from other activities, but felt that the activities it interfered with were not often important for him. They were activities such as watching television. This informant had a good knowledge of the benefits of physical activity throughout the study. He included improvements in mental and cognitive effectiveness, stress reduction, increased productivity and provision of a transition between work and home life. Following the intervention he added that physical activity made him feel better mentally and physically and gave him a more positive outlook on life. Interestingly, during the follow-up interview, he indicated that physical activity had allowed him to enjoy more time with family. He had reported during the first two interviews that physical activity was a cost because it took time away from work and family. The counseling and his recent experience have changed his perceptions of the costs and benefits of physical activity related to time management.

Affective Attitude

This informant perceived a wide range of enjoyment from physical activity. His reported enjoyment ranged from the solitude to the socialization. He commented on his enjoyment of competition as well as on many benefits ranging from physical to cognitive and mental rewards. The major change in perceived enjoyment was the increased focus on intrinsic factors such as his sense of afterglow and accomplishment from regular physical activity. His perceived dislikes were minimal throughout the study. It was noted that he concentrated more on realistic dislikes that he could affect or change.

Control Beliefs

Following the intervention this informant expanded his facilitators for participating in physical activity. Immediately following the intervention he was searching for specific measures and outcomes. He was working on developing a set of alternative activities to keep variety in his physical activity. He was also searching for additional exercise programs and developing a home exercise program. During the follow-up interview he indicated that he was searching for additional ways to facilitate his physical activity and to ingrain his activity. He had begun to work on preventing relapse. During the study period his health had become a problem that caused a relapse in his activity behavior. He had recovered from his surgery and this was no longer interfering with his activity. During the first two interviews he had indicated that time with family and at work prevented him from being physically active. During the follow-up interview he reversed that perception indicating that being active had made him more productive at work and had allowed more time to spend with his family.

Normative Beliefs

Family support was evident to this informant prior to the intervention and following it. During the follow-up intervention much more support was described. The support included support from work and an active group of supporters. His time for physical activity was respected by his family. His wife shared his new commitment to physical activity. She was now more active and they were active together. Their new commitment helped him remain active as well. Prior to the intervention the informant reported no social discouragement. Immediately following the intervention he stated that discouragement was limited but that he felt the time demands of work and sometimes felt a gap between himself and his family because they did different activities. During the follow-up he indicated that he felt discouraged at times but was prepared to deal with it. He felt more resistant to social discouragement.

Reported Individual or Situational Influences

Throughout the study this informant maintained a belief that individual factors were the major barriers to his physical activity. Situational barriers did exist but they could be overcome by individual commitment and effort. He supported this idea the most strongly during the follow-up interview. At that point he used his own personal examples of situational barriers he had overcome during the study period.

Reported Advice for Others

In his advice for others he emphasized the importance of a fitness evaluation and logging of activity as a reality check. Other suggestions he made were to find an exercise partner or to get assistance planning one's program. He stressed that one should approach physical activity gradually after finding good reasons to be active. He believed that prior to trying activity, people should spend some time considering the variety of benefits to be gained by participating in physical activity. For those less active he believed it was critical that they possess a desire to make change. He would offer his support to others who desired to become more active. He would again stress the importance of having a variety of activities, having an evaluation and logging activity. He would help the individual work on setting up measurable goals and rewards for reaching them. Finally he emphasized the need to find someone to workout with or an active group to join.

Informant's Independent Critique

This informant agreed or strongly agreed with all interpretations developed from the interviews in which he participated. He did not note any discrepancies, omissions or additions. Following his recuperation from surgery this informant had relapsed back to irregular activity. Following the intervention and during the eight-week follow-up he had reported being in the stage of action. At the time of the independent critique this informant classified himself as a maintainer. His description of current physical activity suggested that he was walking four kilometers to work, working out in the fitness centre six to seven days a week on aerobic equipment and weights. During the spring summer and fall he was jogging on the trails in the river valley. This report confirmed that he was more active than prior to the intervention. He had integrated physical activity as part of his daily routine. In other words he had made physical activity a habit. A large part of his success was due to he and his wife scheduling an hour meeting each week day at the fitness centre.

Reported Physical Activity

The physical activity interviews are summarized in Table 21. The most notable change in reported physical activity behavior was in the weekly recall of both hard and very hard total activity. Total hard activity increased from two up to seven hours. Originally he reported doing no very hard activity. By the eight-week follow-up he reported participating in a total of eight hours of very hard physical activity

Table 21 Comprehensive and Total Physical Activity for Informant A2

Measurement	*Pre-intervention*	*Post-intervention*	*8-week Follow-up*
Comp. Moderate	4 activities		3 activities
Comp. Vigorous	1 activity		2 activities
Total Sleep	39.0 hours		47.0 hours
Total Sitting	80.0 hours		49.0 hours
Total Light	35.0 hours		37.0 hours
Total Moderate	12.0 hours		20.0 hours
Total Hard	2.0 hours		7.0 hours
Total Very Hard	0.0 hours		8.0 hours
Rate Activity *	more		more

* Comparing the last week to the previous three months.

He ran, rode his bicycle and played basketball strenuously. These changes in reports of total activity were supported by the comprehensive physical activity report. Support was not as conclusive for changes in moderate activity. Although total moderate activity was reported to have increased by the final interview, changes were not supported by comprehensive reports of moderate activities.

Fitness Measures

The summary of this informant's assessment results is presented in Table 22. There were clinically significant changes in three components of fitness. Both push-ups and partial curl-ups increased enough to move the informant up two health zones. Aerobic fitness moved up one health zone. Positive trends were exhibited in body weight and measures of skinfold. These changes indicated positive changes in body composition. A clinically significant drop in leg power was difficult to explain in light of the general improvements exhibited in muscular fitness. The drop in body weight may contribute somewhat to the change in leg power although the vertical jump used as part of the calculation was reduced. Leg power is a relative measure influenced by body weight.

Table 22 Fitness Assessment Summary for Informant A2

Component of Fitness	***Initial Assessment***		***12 Week Follow-up***		***Change***
	Score	Health Zone	Score	Health Zone	
Weight (kg.)	90.0	NA	88.1	NA	↓ 1.9
Height (cm.)	189.0	NA	189.0	NA	=
Waist (cm.)	93.0	H	94.0	H	↑ 1.0
BMI (kg./m.^{2})	25.4	H	24.7	H	↓ 0.7
Skinfold Sum (mm.)	51.3	H	46.9	H	↓ 4.4
Trunk Skinfold (mm.)	30.0	H	27.1	H	↓ 2.9
Resting HR (bpm.)	74	NA	75	NA	↑ 1
Resting BP (mm.Hg.)	125/82	NA	121/82	NA	NA
Aerobic Fitness (pts.)	518	F	556	G	↑ 38
Grip Strength (kg.)	99.0	F	98.0	F	↓ 1.0
Push-ups	11	NI	19	G	↑ 8
Trunk Flexion (cm.)	33.0	VG	36	VG	↑ 3
Partial Curl-ups	22	G	25	EX	↑ 3
Leg Power (kgm./sec.)	123.0	EX	116	VG	↓ 7.0

Key: NA = Not Applicable, EX = Excellent, VG = Very Good, G = Good, F = Fair, NI = Needs Improvement, UH = Un-healthy, H = Healthy

Informant A3 (action)

Description

This 38 year old male subject was a non-academic staff member of the university. He has completed a diploma during post-secondary education. The subject completed a Par-Q evaluation reporting no reason why he could not participate in unsupervised physical activity.

Stage of Change Classification

During the initial telephone interview this subject reported that he was currently exercising regularly but had only begun doing so in the past six months. This report was confirmed just prior to the baseline evaluation. The subject was classified as an active.

Reported Intervention Effects

Following the baseline logging of activity he reduced his evaluation of stage from action to preparation. This informant suffered from various illnesses during the period of the study but definitely felt he was more regularly active following the intervention. In his critique he reflected on this more as a problem of fatigue, both mental and physical, rather than a series of illnesses. He had periods of regular activity but continued to be inconsistent due to illness and fatigue. He suggested that the program helped him to move toward more regular physical activity. He felt he was well educated about the benefits of regular physical activity and gained the tools to measure his progress and set goals. The benefits of physical activity were understood as indicated through clear examples. He realized what his barriers to regular activity were because he was forced to analyze his situation. The tracking of his physical activity behavior had served as a reality check for him. Although he was discouraged by his performance on the fitness evaluations, it did not hamper his motivation, just the opposite. He now realized he had to be active more regularly to achieve his goals. Fatigue was still a problem for this informant at the time of the follow-up evaluation. He had seen several doctors about this fatigue. He hoped that regular activity would help but was not sure that it had helped any. He would appreciate the opportunity to get out of the office if the counseling program could accomplish that. He suggested that the one-week recall of total activity in his last week might be misleading as it had been a week when he was ill. A longer period of measurement may have demonstrated better results. In summary this informant stated that in reality he began the study between the stages of preparation and action. At the time of the follow-up interview he felt more active but not regularly enough to change his stage to action. He was now active regularly unless he was sick.

Suggestions for Improving the Intervention

Prior to beginning the study this informant did not perceive having many expectations for the counseling intervention. He felt that the program could be tailored for him by measuring his fitness and helping him to better understand his fatigue. He wanted to know why physical activity was not recharging him like it had done in the past. He felt it would be useful for the intervention to help him examine his motives and clarify what motivates him. In the follow-up interview he reported that the intervention met and exceeded any expectations that he had developed. The study provided more than he was expecting. This informant did not enjoy the logging and recall of activity. The logging was not enjoyable, but it did cause the informant to analyze what activity he was actually doing. According to this informant the past week recall of physical activity during the follow-up interview did not provide an accurate representation of his activity. He had been sick and was unable to be active that week. A longer recall would have demonstrated his increased level of physical activity. Following the intervention this informant believed he needed several things to continue his change. He needed to strengthen his self discipline and find more interesting activities to pursue. As a counselor it seemed that this informant needed to address his problems with fatigue. He may need to consider making changes in physical activity and sleep patterns as a combined lifestyle change.

Reported Attitude and Belief Effects

Instrumental Attitude

The only cost reported by this informant was the time taken to do physical activity. This was reported consistently across the entire study. More benefits were perceived by this informant than costs. Physical, psychological and cognitive benefits were reported prior to the intervention and again immediately following the intervention. During the third interview the informant evaluated how his increase in physical activity had influenced the benefits he received. He noted better job performance and better muscular endurance. He had developed clear and realistic expectations for reduction of his problems with fatigue, concluding that he would have to be active regularly for several months to experience reductions in his fatigue.

Affective Attitude

Prior to and following the intervention this informant reported that the only enjoyable physical activity for him was sport. During the follow-up he indicated that going to the gym was not enjoyable for him. He reflected at that time on the importance of finding an enjoyable activity. He hoped to find some enjoyable activity to improve his motivation. This informant did not enjoy going to the gym, getting up in the morning and getting motivated to get started. He did not change these perceptions throughout the study.

Control Beliefs

This informant reported finding an enjoyable but physically demanding activity as an important facilitator for his physical activity throughout the length of the study. Prior to the intervention he suggested he was motivated by the desire to improve his health.

Following the intervention he added reaching goals and feeling less fatigued as facilitators. In the follow-up interview he indicated that if he made practical changes such as finding a non-morning activity time, or doing outdoor activities it would lead to more regular activity. Fatigue was a constant barrier for this informant throughout this study although it was also one of the reasons he has decided to attempt to increase his physical activity. In the follow-up interview it was reported that illness and fatigue remained as barriers.

Normative Beliefs

Social support was not reported by this informant prior to the intervention. Following the intervention the major source of social encouragement reported was from the counselor conducting the intervention. At that time and again during the follow-up interview this informant indicated that his workplace seemed more active which encouraged his activity. Initially this informant said he was not discouraged at home but he would feel guilty spending time away from his family. Following the intervention he stated that he would likely be discouraged if he were to add activity in the evenings or wanted to take up sport again.

Reported Individual or Situational Influences

This informant believed that individual factors were his major obstacles. There was little change in this across the duration of the study. Some of the individual factors mentioned were making the time, self-discipline, finding interesting activities and getting over his fatigue. He did mention work time as a situational factor throughout the study.

Reported Advice for Others

Prior to the intervention this informant suggested that others find fun activities or activities that they were genuinely interested in. Following the intervention there was a great expansion of the suggestions made to others. Some of the expanded suggestions were discovering the benefits important to the individual, managing your time to schedule physical activity, finding an exercise partner and seeking help to overcome barriers. He had difficulty making suggestions to those less active than himself.

Informant's Independent Critique

This informant was less active one year following the final interview, indicating that he had done minimal planned exercise for the past six months. At the time of the individual critique he classified himself in the stage of contemplation, indicating that his value for physical activity was still high. He perceived physical activity as very important. In fact he was developing an increased awareness of the importance as he saw and felt the negative results of his inactivity. He did not like the picture painted of himself in the interview interpretations, but agreed with the interpretations with only minimal mention of discrepancies, omissions or additions. In regards to normative beliefs he suggested that he felt that additional time for physical activity would be frowned upon due to his increasing commitments to volunteer activities.

Reported Physical Activity

This informant indicated that he had been ill during the recall week but in general reported being more active in the post-intervention interview. The comprehensive and total reports support this contention. The activity interviews are summarized in Table 23. Both comprehensive moderate and vigorous activity were reported to have increased by the follow-up interview. The informant indicated that he was active less during the recall week than over the previous three months. He reported doing more very hard activity in the post-intervention interview but this decreased by the time of the follow-up interview.

Table 23 Comprehensive and Total Physical Activity for Informant A3

Measurement	*Pre-intervention*	*Post-intervention*	*8-week Follow-up*
Comp. Moderate	2 activities	1 activity	4 activities
Comp. Vigorous	0 activities	0 activities	1 activity
Total Sleep	46.0 hours	46.0 hours	42.0 hours
Total Sitting	100.0 hours	60.0 hours	84.0 hours
Total Light	8.0 hours	47.0 hours	33.0 hours
Total Moderate	9.0 hours	10.0 hours	5.0 hours
Total Hard	4.0 hours	1.0 hour	2.0 hours
Total Very Hard	1.0 hours	4.0 hours	2.0 hours
Rate Activity *	more	more	less

* Comparing the last week to the previous three months.

Fitness Measures

The complete results of the fitness assessment for Informant A3 are summarized in Table 24.

Table 24 Fitness Assessment Summary for Informant A3

Component of Fitness	*Initial Assessment*		*12 Week Follow-up*		*Change*
	Score	Health Zone	Score	Health Zone	
Weight (kg.)	87.4	NA	86.4	NA	↓ 1.0
Height (cm.)	186.0	NA	186.0	NA	=
Waist (cm.)	95.0	H	92.0	H	↓ 3.0
BMI (kg./m.^{2})	26.3	H	25.0	H	↓ 1.3
Skinfold Sum (mm.)	54.9	H	56.4	H	↑ 1.5
Trunk Skinfold (mm.)	30.1	H	30.4	H	↑ 0.3
Resting HR (bpm.)	92	NA	82	NA	↓ 10
Resting BP (mm.Hg.)	125/80	NA	127/78	NA	NA
Aerobic Fitness (pts.)	516.9	F	519.0	F	↑ 2.1
Grip Strength (kg.)	119.0	VG	131.0	EX	↑ 12
Push-ups	14	F	14	F	=
Trunk Flexion (cm.)	37.0	VG	39.5	EX	↑ 2.5
Partial Curl-ups	23	VG	24	VG	↑ 1
Leg Power (kgm./sec.)	131.0	EX	127	EX	↓ 4.0

Key: NA = Not Applicable, EX = Excellent, VG = Very Good, G = Good, F = Fair, NI = Needs Improvement, UH = Un-healthy, H = Healthy

Two clinically significant improvements in fitness were noted in this informant by the time of the follow-up assessment. Grip strength and flexibility were placed in a higher health zone following the intervention. Two changes in heart rate suggest some training effects. His maximum heart-rate during the sub-maximal step test was reduced from 171 to 161 beats per minute at the same stage of stepping. His resting pulse was ten beats lower prior to the assessment on the follow-up assessment. Although these effects do not demonstrate clinically significant change they were useful to promote physical activity to the informant during the counseling intervention.

Informant M1 (maintenance)

Description

This 33 year old subject was a staff member of the university. He has completed a post-secondary undergraduate degree. The subject completed a Par-Q evaluation, reporting that he had had previous surgery to remove a tumor. He reported no reasons why he could not participate in unsupervised physical activity.

Stage of Change Classification

During the initial telephone interview this subject reported that he was currently physically active and had been so for longer than six months. This was confirmed prior to the baseline period. The subject was classified as a maintainer.

Reported Intervention Effects

Prior to participating in the intervention this informant reported his desire to set aside some time to do strength training. He also indicated that he needed to increase the intensity of his walks. He was looking for encouragement to do more activity and for information on home strength training. This informant did not demonstrate a positive behavioral response to the intervention. He reported being in maintenance prior to the intervention and following it. At the time of the follow-up evaluation the informant reported falling to the stage of preparation for physical activity adoption. His activity had been seasonal and was strongly affected by the onset of fall and winter. He was involved in extensive home renovations while his family was away which was filling his schedule. This limited his activity at that point. This was physical activity but did not maintain intense activity. This indicated a lack of success of the intervention to prevent relapse in this informant. Following the intervention the informant indicated that the counseling encouraged him to do more activity as his wife had wanted. He now realized that his motivation came from himself and his family. During both the post intervention and the follow-up he recognized the role of clearly identifying the benefits important to him. He indicated that he was now beyond thinking hypothetically and was ready to make some changes. Following the intervention the informant indicated that he planned to continue activity following the study. He did not believe that he needed much more exercise. He wanted to do more strength training and cardiovascular activity. He stated that his attitude toward physical activity had changed. He placed more value on the benefits and perceived more fringe benefits. In general he felt more educated and aware. Following the intervention the informant recognized that to continue his change he would need to better organize his time, plan to deal with the changing seasons and to develop a plan to do more physical activity with his spouse.

Suggestions for Improving the Intervention

Following the intervention the informant indicated that he realized that his motivation came from within and that there was not much more that the intervention could have done. During the follow-up it was added that the intervention might have focus more on highlighting the extra or unseen benefits of physical activity. For example, in academic or competitive business environments, highlighting the cognitive benefits of physical activity might be advised. Following the intervention and during the follow-up, there was no suggestion for removing anything from the intervention.

Reported Attitude and Belief Effects

Instrumental Attitude

There was a limited perception of costs related to physical activity by this informant . Only time and money were reported as costs prior to and following the intervention. Benefits were consistently reported throughout the length of this study. Benefits included improved health, self-esteem, well-being and emotional health. Perception of benefits was stable throughout the study.

Affective Attitude

This informant reported enjoying being outside, walking his dog and cycling as an efficient non-polluting way to get around. During the follow-up he added that he enjoyed social activity relating to physical activity. He indicated at that time that he enjoyed things associated with physical activity as much as the activity itself. This informant did not express any serious dislikes of physical activity. He did not like to participate in activities that stressed his knee too much or participate in sports where performance was the focus.

Control Beliefs

Prior to the intervention this informant concentrated on facilitators that currently motivated him. This included factors such as wanting to do more with his family, wanting to maintain health and to socialize. Following the intervention he focused his concentration on facilitators that would help increase his level of activity. An example of this was to better organize time to allow physical activity. Barriers to physical activity were consistent throughout this study, the major ones being time constraints and pressures from work and home.

Normative Beliefs

Throughout the study this informant indicated that he perceived support from his spouse. She provided encouragement which allowed him to plan for physical activity. During the follow-up interview the informant indicated that although his wife encouraged physical activity with his family she discouraged his individual activity. He indicated that it was not a major problem, but if he received more support he would try other physical activities.

Reported Individual or Situational Influences

This informant emphasized several times that the situation was a major influence for him. He then indicated that it was up to him individually to take control, of and to, adapt to the situation. In summary he felt that both the situation and individual factors influenced his adherence to physical activity.

Reported Advice for Others

This informant suggested that people begin with moderate activities and then increase the level of activity. In that way they could avoid some of the negative things relating to physical activity, such as time conflicts, pain and stiffness. He added that it should be promoted to those increasing activity that they can do more with their life if they are active. During the follow-up intervention the informant expanded on his suggestions. At that point he suggested developing a list of winter activities to avoid laying off during the winter. He suggested that those trying to be active should find a non-threatening environment. They should develop a mind-set which would allow them to do something on a regular basis.

Informant's Independent Critique

This informant relapsed several months prior to the independent critique. At that time he reported being in contemplation. In November he was diagnosed with cancer and was scheduled to have surgery on his leg in January. Since his diagnosis his physical activity had been reduced. At the time of the critique he was walking several days a week for ten minutes or more. Swimming was a regular weekly activity. He was swimming not so much for exercise as for enjoyment. He enjoyed swimming with family and friends. His situation was responsible for reducing his physical activity as compared to prior to the intervention. The informant agreed with all the interpretations of the interviews. He did not suggest any discrepancies, omissions or additions. It is worth noting a change in attitude he expressed during the independent critique. He indicated that getting out and being active was more of a priority. He indicated that activity with his family was now a priority over the demands of work. He was scheduling work he had to bring home around family activities rather than interfering with family activities. He did not suggest if these changes in priorities were a result of the counseling or were influenced by other things occurring in his life.

Reported Physical Activity

When this informant began the study he reported participating in one vigorous activity. This activity was seasonal. As the season changed his vigorous activity was reduced. In general his report of total activity was reduced immediately following the intervention. Reports of total moderate and hard activity increased to levels higher than the pre-intervention levels by the time of the follow-up interview. Total very hard activity was not reestablished during the period of the study. The complete summary of activity interviews is provided in Table 25.

Table 25 Comprehensive and Total Physical Activity for Informant M1

Measurement	***Pre-intervention***	***Post-intervention***	***8-week Follow-up***
Comp. Moderate	4 activities	5 activities	3 activities
Comp. Vigorous	1 activity	0 Activities	0 activities
Total Sleep	41.5 hours	41.5 hours	39.0 hours
Total Sitting	54.5 hours	40.5 hours	24.0 hours
Total Light	29.0 hours	63.0 hours	55.0 hours
Total Moderate	38.0 hours	23.0 hours	45.0 hours
Total Hard	3.5 hours	0.0 hours	5.0 hours
Total Very Hard	1.5 hours	0.0 hours	0.0 hours
Rate Activity *	less	same	more

* Comparing the last week to the previous three months.

Fitness Measures

The fitness assessment results for this informant are summarized in Table 26. The fitness assessment results indicate that a reduction in physical activity has led to a clinically

Table 26 Fitness Assessment Summary for informant M1

Component of Fitness	***Initial Assessment***		***12 Week Follow-up***		***Change***
	Score	Health Zone	Score	Health Zone	
Weight (kg.)	72.8	NA	75.5	NA	↑ 2.7
Height (cm.)	178.0	NA	177.0	NA	↓ 1.0
Waist (cm.)	87.2	NA	NA	NA	NA
BMI (kg./m.^{2})	22.8	H	24.1	H	↑ 1.3
Skinfold Sum (mm.)	43.9	H	56.9	H	↑ 13
Trunk Skinfold (mm.)	20.8	H	28.8	H	↑ 8
Resting HR (bpm.)	59	NA	81	NA	↑ 22
Resting BP (mm.Hg.)	118/88	NA	132/98	NA	NA
Aerobic Fitness (pts.)	600	EX	597.4	VG	↓ 2.6
Grip Strength (kg.)	95	NI	91	NI	↓ 4.0
Push-ups	31	EX	29	VG	↓ 2
Trunk Flexion (cm.)	11.0	NI	16.2	NI	↑ 5.2
Partial Curl-ups	23	VG	19	G	↓ 4
Leg Power (kgm./sec.)	108.3	VG	117.0	VG	↑ 8.7

Key: NA = Not Applicable, EX = Excellent, VG = Very Good, G = Good, F = Fair, NI = Needs Improvement, UH = Un-healthy, H = Healthy

Significant reductions in fitness. Aerobic fitness, push-ups and sit-ups were all reduced to levels that were clinically significant. Changes in body weight and body composition suggest a negative trend. Although these changes in composition were not clinically significant, the consistent increases suggest that lower levels of physical activity were contributing to a trend of increased body fat

Informant M2 (maintenance)

Description

This 37 year old male subject was a faculty member at the university. He has completed a Ph.D. during post-secondary education. The subject completed a Par-Q evaluation reporting no reasons why he could not participate in unsupervised physical activity.

Stage of Change Classification

During the initial telephone interview the subject reported that he participated in regular physical activity and had done so for longer than six months. This report was confirmed prior to the baseline period. The subject was classified as a maintainer.

Reported Intervention Effects

Prior to the intervention this informant was walking to and from work unless the temperature was less than minus twenty five degrees. This usually took 15 to 20 minutes two times per day on weekdays. This walking was not considered to be intense. At that point he was less active than he had been at previous times. His lowered activity was due to the demands of his work. This informant remained in maintenance throughout the duration of the study. The informant reports that he had made changes in the intensity of his activity, beginning to move from walking up to jogging. He was exercising the same amount of time but was parking further from work to cover more distance on the way to work. The informant stated that this program had helped more than anything else. He discovered that his goals would not be met by walking slowly to work. He found out more about the types of activities that he needed to do to improve his health and fitness. He suggested that he had been aware that his intensity was likely too low for a long time. He stated that his attitude toward physical activity had improved. He wouldn't make changes to the intervention. He felt that the intensity and focus of the intervention was just right for him.

Suggestions for Improving the Intervention

This informant was very satisfied with the program. He made no suggestion of discouragement from the intervention or any call for reductions in any part of the program. He indicated that he appreciated the "soft sell" approach of the program. He would not have wanted more structure.

Reported Attitude Belief and Effects

Instrumental Attitude

Prior to the intervention this informant expressed some concern that doing too much physical activity could become a cost. Physical activity could take time from other important activities. He also stated that activity could be boring if it was done for the purpose of getting fit alone. Following the intervention he reported no costs associated with physical activity. Prior to and following the intervention this informant reported several benefits of physical activity: physical health, mental health and stress relief. He found that his walk to and from work provided a time to clear his mind and to relax.

Affective Attitude

There was minimal change in the perceptions of enjoyment for this informant. He mentioned enjoying cycling to see things from a different perspective. He indicated that for him physical activity had to be done for a purpose or an outcome for him to continue to do it regularly. He repeated that he did not like to do physical activity for its own sake. Exercise of some types was reported as boring.

Control Beliefs

Prior to the intervention this informant reported some realistic factors that would facilitate physical activity. One factor was finding someone who would like to participate in the same type of activities. Following the intervention the informant had concentrated his perception of facilitators on some specific barriers he had identified. He indicated that if he had a less demanding job it might provide him time to discover some physical activities he enjoyed. His facilitators were generally situational, much like his perceived barriers. The barriers again were consistent across the length of the study. He indicated that time demands and the weather were his two major barriers to physical activity.

Normative Beliefs

Throughout the study limited social support was reported by this informant. His wife wanted him to be active but did not participate herself. He felt supported by his wife and by some people at work. Prior to the intervention he indicated that his wife could be more encouraging. He would be more active on weekends if his wife participated with him in physical activity. The hours he was required to work acted to discourage his physical activity. Following the intervention this informant did not perceive discouragement. He stated that anyone who might discourage him was likely not involved.

Reported Individual or Situational Influences

For this informant the focus remained stable. He felt that his barriers to physical activity were generally situational. He felt that he was more active when he had more time to be active. It was a matter of time management for this informant.

Reported Advice for Others

The advice suggested by this informant for those wishing to become more active included getting rid of your parking place at work so that you would walk to and from work. Following the intervention this informant suggested that people find physical activities with a purpose or the type of activities that motivated them.

Informant's Independent Critique

This informant strongly agreed with all areas of the interview interpretations and did not indicate discrepancies, omissions or additions. One year following the final interview the subject indicated that he was about as active as he had been prior to the intervention. He had increased the intensity of his walking to and from work during and following the intervention, but the intensity had dropped since to some extent. For some time he had been combining jogging and walking as he went to and from work. At the time of the critique he was walking at an intensity greater than prior to the intervention. In terms of attitude he suggested that he was now more aware of the value and need for regular exercise. He had not really changed the way he integrated activity into his daily life, other than the change in intensity as previously mentioned.

Reported Physical Activity

The comprehensive measure of moderate activity suggested that moderate activity levels remained consistent throughout the study. More detailed investigation of the hours of moderate activity suggested a drop in the time spent in moderate physical activity by this informant. The measure of total hard activity suggests a reevaluation of hard activity following the intervention. Total very hard activity was increased in the report at the time of the follow-up. This corresponds to the comprehensive report of at least 16 kilometers of jogging or running by the informant during the follow-up interview. A complete summary of the physical activity interviews is provided in Table 27.

Table 27 Comprehensive and Total Physical Activity for Informant M2

Measurement	*Pre-intervention*	*Post-intervention*	*8-week Follow-up*
Comp. Moderate	4 activities	4 activities	4 activities
Comp. Vigorous	0 activities	0 activities	1 activity
Total Sleep	35.0 hours	28.0 hours	42.0 hours
Total Sitting	90.0 hours	105.0 hours	105.0 hours
Total Light	31.0 hours	29.5 hours	9.5 hours
Total Moderate	10.0 hours	5.5 hours	7.0 hours
Total Hard	2.0 hours	0.0 hours	2.0 hours
Total Very Hard	0.0 hours	0.0 hours	2.5 hours
Rate Activity *	same	more	same

* Comparing the last week to the previous three months.

Fitness Measures

The complete results of fitness assessments are summarized in Table 28. The only clinically significant change in fitness for this informant was an increase in leg power. There were suggestions of positive trends in grip strength, push-ups, trunk flexion and partial curl-ups. A reduction in resting heart rate was consistent with the training effects of vigorous physical activity. But the effect was not supported by clinically significant changes in his aerobic fitness.

Table 28 Fitness Assessment Summary for Informant M2

Component of Fitness	***Initial Assessment***		***12 Week Follow-up***		***Change***
	Score	Health Zone	Score	Health Zone	
Weight (kg.)	76.6	NA	77.4	NA	↑ 0.8
Height (cm.)	184.0	NA	185.0	NA	↑ 1.0
Waist (cm.)	86.3	H	86.0	NA	↓ 0.3
BMI (kg./m.^{2})	22.6	H	22.6	H	=
Skinfold Sum (mm.)	40.9	H	42.0	H	↑ 1.1
Trunk Skinfold (mm.)	20.3	H	21.7	H	↑ 1.4
Resting HR (bpm.)	73	NA	64	H	↓ 9
Resting BP (mm.Hg.)	121/82	NA	118/78	NA	NA
Aerobic Fitness (pts.)	546	G	544	G	↓ 2
Grip Strength (kg.)	100.0	F	104.0	F	↑ 4.0
Push-ups	6	NI	10	NI	↑ 4
Trunk Flexion (cm.)	35.0	VG	37.5	VG	↑ 2.5
Partial Curl-ups	5	NI	11	NI	↑ 6
Leg Power (kgm./sec.)	101.0	G	109.0	VG	↑ 8

Key: NA = Not Applicable, EX = Excellent, VG = Very Good, G = Good, F = Fair, NI = Needs Improvement, UH = Un-healthy, H = Healthy

Informant M3 (maintenance)

Description

This 41 year old male subject was an academic staff member of the university. He has completed a post-secondary degree. The subject completed a Par-Q evaluation reporting no reason why he could not participate in unsupervised physical activity.

Stage of Change Classification

During the initial telephone interview the subject reported that he participated in regular physical activity and had done so for longer than six months. This report was confirmed just prior to the baseline period. The subject was classified as a maintainer.

Reported Intervention Effects

Several years prior to this study the informant came to a realization that his lack of physical activity was limiting the other things he wanted to do. He began to run alone and then a friend joined him. At that point he became a committed runner. This informant remained in maintenance throughout the study. He did report struggling with injuries and was considering several alternatives to remain active through injuries and to reduce his problems with injuries. To some extent he was limited in following the counseling advice by injury and illness. During the study this informant was sedentary for a short time as a result of injury but moved quickly back into regular activity. He was quick to get active because of his appreciation of how well his body felt and worked when he was fit. He felt pressured and was highly motivated to get back into physical activity as quickly as possible. The program was helpful to this informant. The counseling provided useful information on injury prevention. The counseling provided some perspective to his physical activity. He suggested that some runners have a tendency to be obsessive/compulsive in their pursuit of physical activity. It was beneficial for him to hear some alternate perspectives. He found it confirming to know what he was doing was doing him some good. The fitness evaluation confirmed that his program was working. He saw that he needed to improve his flexibility and considered the importance of flexibility to his long-term commitment to physical activity. He felt that his self-confidence had been positively affected by the intervention.

Suggestions for Improving the Intervention

This informant believed that establishing contacts and activity partners following an intervention, such as provided by the counseling, was essential to the determination of whether people become maintainers. The intervention would be improved by developing a network of contacts with similar motivations and interests. Another option would be to help individuals pair up with others who were in a similar stage. This would serve as a continuing source of motivation when the intervention was complete. Using heart-rate monitors could provide more accurate monitoring of behavior changes and help people to learn to monitor their activity intensity more reliably. He indicated the importance of ensuring that people started moderately. It was important to take care not to go too hard either mentally or physically as they began. Those who went too fast or too hard were more likely to lose interest and just fade-out. Maintainers should discuss the possibility of burn-out during the counseling sessions. He felt that less forms and questionnaires could have been used during the study. He was not confident in his ability to monitor heart-rate even though he has been a regular exerciser for many years.

Reported Attitude and Belief Effects

Instrumental Attitude

Prior to and following the intervention, injury and the frustration of not being able to be physically active were the only two costs reported. At those points, time was not perceived as a cost. During the follow-up interview, time conflicts were perceived as costs of physical activity. Prior to the intervention this informant perceived his enjoyment of activity as the foremost benefit. He reported enjoying the social aspect, the relaxation, the physical maintenance of his body, the boost to his ego and the satisfaction of competition. Following the intervention he added feeling in control and feelings of physical wellness as benefits. During the follow-up interview he reflected on the pleasant nature of physical activity. In general many of the benefits were consistently reported across the length of the study. He included physical, cognitive and psychological benefits. In addition he included intrinsic benefits and his pure enjoyment as benefits he received from participation in physical activity.

Affective Attitude

Throughout the three interviews in this study the informant perceived diverse sources of enjoyment from physical activity. Several dimensions of enjoyment included outcomes, intrinsic feelings, feelings directly associated with being physical such as physical sensations and social enjoyment. These were maintained consistently throughout the study. Perceived dislikes of physical activity were also very consistent over the study duration. His major concerns in this regard were worries about an obsession with physical activity, coping with forced periods of inactivity and dealing with nagging injuries.

Control Beliefs

This informant perceived a large number of facilitators from a wide range of directions. For example he was motivated by health concerns, for social reasons and by competition. Prior to the intervention the informant reported fear motivations such as the realization that if he was not active his body would deteriorate and a fear of the health consequences of inactivity. At that juncture he also noted his enjoyment of activity as a significant motivation. Following the intervention there was no longer a mention of the negative forms of facilitation. His facilitators perceived at that point were all framed from a positive light. This was not significant because he indicated during the individual critique that he still felt the same but did not mention the negative facilitation during the second interview. During the follow-up interview there was an expanded perception of facilitators and more detail provided on the facilitators. For example he expanded on the importance of running for him, how it was natural for him, how he had had immediate success and how running felt physically good for him. In summary he seemed to reflect on facilitators following the intervention and had greater perceptions of them as a result. The informant had very consistent perceptions of his barriers to physical activity. The major barrier he reported was the negative influence of others that did not understand the importance of physical activity to him. He indicated several times during the interviews that it was difficult to explain the experience to those who were not doing it.

Normative Beliefs

Support was consistently perceived during the three interviews by this informant. He received support from most friends and family members and some co-workers. Interestingly he commented on the range of support by stating that some people tolerated his physical activity while others truly understood and supported it. The informant's perceptions of social disapproval were consistent across the length of the study. He noted some family disapproval and disapproval from his girlfriend. He stated that he perceived more of a tolerance from these sources rather than what he would call disapproval. He had sensed that if he were to add more physical activity to his schedule he would have to expect more disapproval.

Reported Individual or Situational Influences

Prior to and following the intervention this informant perceived that the majority of the factors that influenced his physical activity behavior were individual. Because he was highly motivated he felt that he was able to overcome any situational barriers that might interfere with his physical activity. For this informant, doing physical activity was automatic. During the follow-up interview this informant indicated that situational barriers were important but for him the situation was under control. For him work demands, injuries and access to physical activity were the situational things. If he found situational barriers in any of these areas he felt prepared to adapt to the situation and continue to be physically active.

Reported Advice for Others

This informant provided a wide variety of advice for individuals attempting to maintain physical activity. He suggested finding an exercise partner, looking for support and finding physical activity that was enjoyable. Exercises that were boring should be avoided. He suggested that you associate with people who have a positive attitude toward physical activity. For people who were currently maintaining physical activity, he suggested they should pay particular attention to avoiding obsession with and burnout from physical activity. For individuals less active he suggested that they concentrate on identifying physical activities they enjoy. He indicated that it was advisable to workout with a group and to talk with experienced people to set up a program, set objectives and a plan to reach them. He reflected on the importance of searching for sources of support for changing activity behavior.

Informant's Independent Critique

This informant agreed or strongly agreed with all the interpretations of interviews conducted during this study. The interpretations were modified to reflect his thoughts even more accurately. In two instances wording was strengthened to more accurately represent his feelings. In terms of intervention effects he felt that the major contribution of the counseling was the emphasis placed on his problems with flexibility and how to start dealing with poor flexibility. He had recognized a concern about being addicted to exercise prior to the intervention. During the critique he speculated that in his case obsession and injury went "hand in hand". When he was not injured he just exercised and it seemed completely natural and relaxed. When he was injured though, he worried about not exercising. He indicated that he had difficulty maintaining his fitness and activity during the intervention due to injury. He was unable to make use of training and competition advice at that time. A year following the final interview he was less inclined to train for competition and had lowered his expectations to avoid frustration. Although he was less active at the time of the critique, he reported significant activity including running two times per week and playing hockey one night per week. In addition to these aerobic activities he was weight training and doing push-ups and sit-ups twice a week for 20 minutes. He did not have any changes in how he valued physical activity. A change in his job and moving into a new house had led to an alteration in his exercise regime. He felt his new regime was not working out as well as his past activity pattern.

Reported Physical Activity

The physical activity reports of this informant were consistent across the duration of the study. Both comprehensive and total activity reports demonstrated solid maintenance of physical activity. Moderate and hard total activity reflects some variability in physical activity but more vigorous activity was consistent. The complete physical activity interviews are summarized in Table 29.

Table 29 Comprehensive and Total Physical Activity for Informant M3

Measurement	*Pre-intervention*	*Post-intervention*	*8-week Follow-up*
Comp. Moderate	3 activities	3 activities	3 activities
Comp. Vigorous	1 activity	1 activity	1 activity
Total Sleep	47.0 hours	49.0 hours	42.5 hours
Total Sitting	80.0 hours	80.0 hours	80.0 hours
Total Light	36.5 hours	26.0 hours	38.5 hours
Total Moderate	0.0 hours	5.0 hours	2.0 hours
Total Hard	0..0 hours	2.0 hours	0.0 hours
Total Very Hard	4.5 hours	6.0 hours	5.0 hours
Rate Activity *	more	less	same

* Comparing the last week to the previous three months.

Fitness Measures

There was little change in any components of fitness indicated on the follow-up assessment. The complete summary of fitness assessment results is presented in Table 30. A low score on trunk flexion demonstrated a problem with flexibility. This may be resultant to the injury problems reported by this informant, or could predispose the informant to such injuries. There was a significant reduction in leg power demonstrated on the follow-up assessment.

Table 30 Fitness Assessment Summary for Informant M3

Component of Fitness	***Initial Assessment***		***12 Week Follow-up***		***Change***
	Score	Health Zone	Score	Health Zone	
Weight (kg.)	73.5	NA	72.9	NA	↓ 0.6
Height (cm.)	188.0	NA	188.0	NA	=
Waist (cm.)	82.0	H	80.0	H	↓ 2.0
BMI (kg./m.^{2})	20.8	H	20.8	H	=
Skinfold Sum (mm.)	30.3	H	28.5	H	↓ 1.8
Trunk Skinfold (mm.)	16.3	H	14.2	H	↓ 2.1
Resting HR (bpm.)	84	NA	79	NA	↓ 5
Resting BP (mm.Hg.)	110/80	NA	118/78	NA	NA
Aerobic Fitness (pts.)	538	EX	539	EX	↑ 1
Grip Strength (kg.)	116.0	VG	110.0	VG	↓ 6.0
Push-ups	30	EX	35	EX	↑ 5
Trunk Flexion (cm.)	10.0	NI	12.5	NI	↑ 2.5
Partial Curl-ups	25	EX	25	EX	=
Leg Power (kgm./sec.)	113.0	EX	110.0	VG	↓ 3.0

Key: NA = Not Applicable, EX = Excellent, VG = Very Good, G = Good, F = Fair, NI = Needs Improvement, UH = Un-healthy, H = Healthy

Qualitative Summary of Reported Individual Intervention Effects

The individual results presented in this section will be amalgamated and synthesized during the discussion of this paper. To get an overview of the effects gleaned from the qualitative interviews a table is presented that overviews how each individual informant has responded to the intervention. This information is presented in Table 31. The table summarizes the rating of stage by the informants as the study progressed. Aspects of beliefs that were affected following the intervention at the time of follow-up or one year following the intervention are indicated. Finally the table indicates which informants indicated that the counseling intervention was effective. This is only an overview. The information will be developed more comprehensively in the discussion to follow.

Table 31

An Overview of the Reported Intervention Effects

Mem #	STAGE				ATTITUDE				INTERVENTION			
	1	2	3	SIC	1	2	3	SIC	1	2	3	SIC
P1	PRE	PRE	PRE	PRE	NA	A, C, N	I, A, C, N	I, A, C, N	NA	E	E	E
P2	PRE	ACT	ACT	ACT	NA	I, A, C, N	I, A, C, N	I, A, C, N	NA	E	E	E
P3	CON	PRE	PRE	ACT	NA	I, A, C	I, A, C	I, A, C, N	NA	E	E	E
A1	PC	ACT	ACT	MAN	NA	I, C	I, C, N	I, C, N	NA	E	E	E
A2	PRE	ACT	ACT	MAN	NA	C, N	I, A, C, N	I, A, C, N	NA	E	E	E
A3	ACT	PRE	PRE	CON	NA		I, A, C, N	I, A, C, N	NA	E	E	E
M1	MAN	MAN	PRE	CON	NA	C	C, N	I, A, C, N	NA	E	E	E
M2	MAN	MAN	MAN	MAN	NA	I, N	I, N	I, N	NA	E	E	E
M3	MAN	MAN	MAN	MAN	NA		I, C, N	I, C, N	NA	E	E	E

Key

SIC=informants independent critique
NA=not applicable(question was not discussed)
Stages: PC=precontemplation, CON=contemplation, PRE=preparation, ACT=action, MAN=maintenance
Attitude Change: I=instrumantal , A=affective, C=control, N=normative
Intervention Perceptions: E=effective, NE=not effective

Belief and Attitude Change

A global measure of attitude was constructed by averaging the 12 instrumental and affective scales. Global subjective norm and perceived control were assessed by averaging the two scales for each belief. The data gathered from these scales are summarized in Table 32.

Table 32

Quantitative Attitude Averages Measured Three Times

Informant	*Global Attitude* (instrumental and affective)*			*Global Control Beliefs**			*Global Subjective Norm Beliefs**		
	#1	*#2*	*#3*	*#1*	*#2*	*#3*	*#1*	*#2*	*#3*
P1	5.08	5.58	5.92	4.50	5.00	4.50	6.00	7.00	7.00
P2	5.25	5.17	5.42	3.50	4.00	4.00	6.00	6.50	7.00
P3	5.75	6.00	6.00	4.50	4.50	4.50	6.00	5.00	6.00
A1	4.83	5.50	5.58	2.50	5.00	5.50	5.50	6.00	5.50
A2	5.17	6.00	6.25	5.00	4.50	6.00	6.00	6.50	7.00
A3	5.75	6.00	6.00	5.00	6.50	5.00	6.50	6.00	4.50
M1		5.00	6.33		5.50	5.50		5.50	6.00
M2	5.42	5.83	6.08	5.00	6.50	6.50	7.00	7.00	7.00
M3	6.75	6.42	6.58	6.50	6.50	7.00	6.00	5.00	5.00

* all scores are a scale average out of a possible rating of seven

There was a degree of agreement between qualitative and quantitative interpretations of attitude change following the intervention and its follow-up. In terms of global attitude change the qualitative interpretations of change are supported in the cases of all nine informants. The support was not as strong in the case of perceived control and subjective norm. Because qualitative interpretations were supported by independent review by each informant the majority of weight was placed on these findings. With the limited number of informants the emphasis of this research was focused on qualitative findings. The scale used in this case served to support or point out where changes were not as convincing. The comparison in this case suggests that changes in global attitude had both qualitative and quantitative support while changes in perceived control and subjective norm are less concrete. The results of these comparisons are summarized in Table 33.

Table 33

Agreement or Disagreement Between Qualitative and Quantitative Belief Interpretations

	Global Attitude		*Perceived Control*		*Subjective Norm*	
Informant	Qual	Quant	Qual	Quant	Qual	Quant
P1	yes	yes	Yes	yes	yes	yes
P2	yes	yes	Yes	yes	yes	yes
P3	yes	yes	Yes	no	yes	no
A1	yes	yes	Yes	yes	yes	yes
A2	yes	yes	Yes	yes	yes	yes
A3	yes	yes	Yes	yes	yes	no
M1	yes	yes	Yes	no	yes	yes
M2	yes	yes	No	yes	yes	no
M3	yes	yes	Yes	yes	yes	no

Case Study Data

Measurement of Exercise

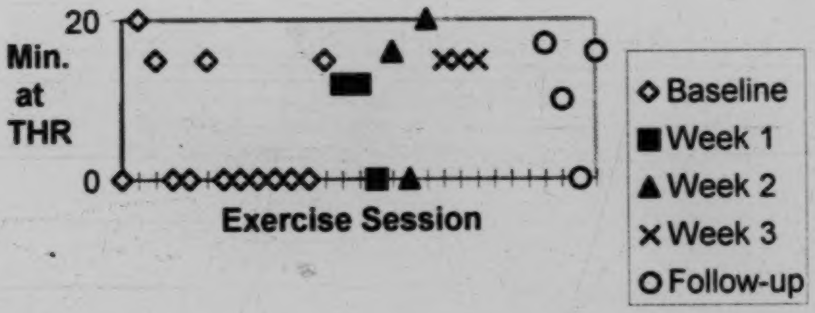
Each of the informants was asked to maintain a log of exercise during the five phases of the study. A baseline log was completed prior to the intervention. Each of three weeks of the intervention were logged and a one-week follow-up was collected eight weeks after the intervention. The informants were asked to describe their total activity time as well as the exercise duration as defined by minutes spent in their prescribed target heart rate zone. They determined the time spent exercising at target heart rate zone by recording their pulse at two times during their physical activity session.

The interpretations to flow from single-subject data are limited by a number of concerns. Although the design combined a multiple baseline methodology with a changing criterion design in reality the informants did not comply well with the design. That is to say each of the three informants in a stage had a varied baseline evaluation of from three to six weeks. With each counseling session a criterion was set for informants to attempt. For example they might be expected to exercise at target heart-rate for 15 minutes in week one, 20 minutes in week two and so on. Some informants failed to have stable baselines, some failed to follow the criterion set out each week. The measurement of time spent exercising at target heart-rate was hampered by problems with compliance in logging and difficulties in accurately self-evaluating intensities and duration of exercise. In short the single-subject data alone is of questionable validity and is not suitable for rigorous single-subject analysis. It does however provide additional information which can be interpreted in conjunction with the information from the qualitative interviews. Accordingly, the single-case data reported in the following pages will be discussed together with the qualitative data in the discussion to follow.

Informant P1 demonstrated a stable baseline. There was an unclear step-like progression following an increasing time criterion during the intervention. The informant's behavior increased but it did not follow the steps of progression suggested during the intervention. There was a general increase in exercise duration during the intervention and during the follow-up probe. A graphical representation of this informant's exercise behavior is presented in Figure 3.

Figure 3

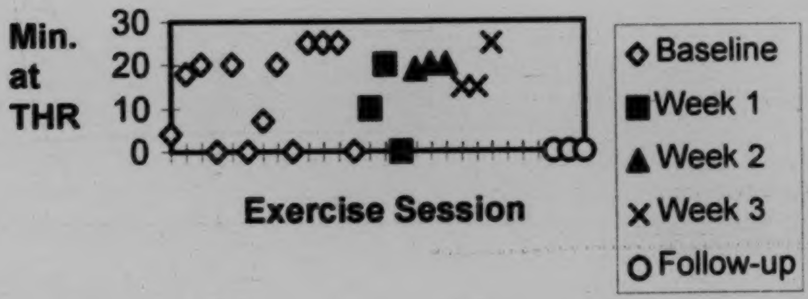
Time Spent Exercising at Target Heart Rate for Informant P1



The baseline report of exercise for Informant P2 was unstable making comparison to intervention and follow-up levels difficult. This report of exercise did not demonstrate clear step-wise progression during the intervention. Exercise was not reported during the follow-up probe. A graphical representation of the this informant's exercise behavior is presented in Figure 4.

Figure 4

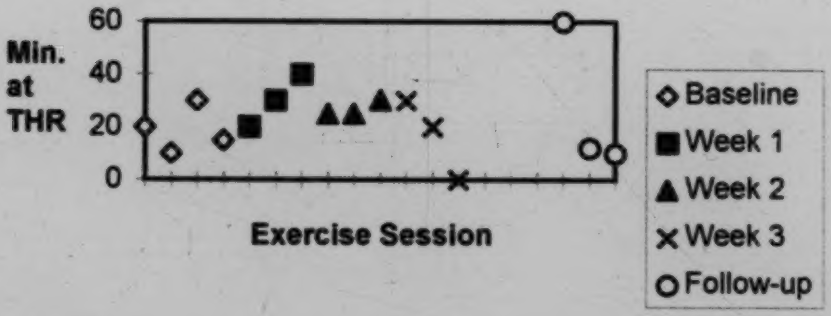
Time Spent Exercising at Target Heart Rate for Informant P2



Informant P3 recorded a short unstable baseline. This may indicate poor compliance with the logging or a lack of activity. There was no obvious progression in the time spent exercising during or following the intervention. A graphical representation of this informant's exercise behavior is presented in Figure 5.

Figure 5

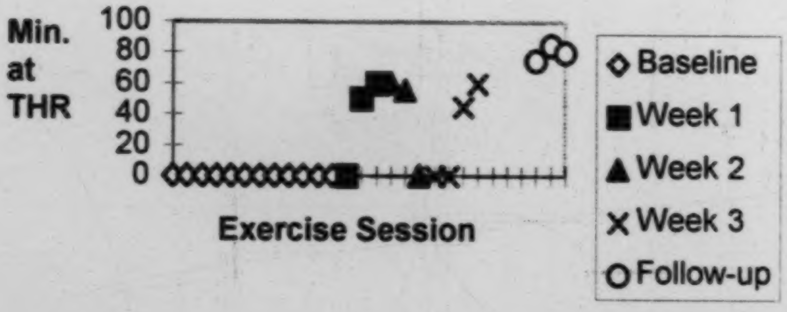
Time Spent Exercising at Target Heart Rate for Informant P3



Informant A1 recorded a stable baseline. A definite increase in level of exercise was recorded during the intervention, although this progress did not follow a stepwise progression. There was a continued progress in both regularity and level of exercise noted at the time of the eight-week probe. A graphical representation of the this informant's exercise behavior is presented in Figure 6.

Figure 6

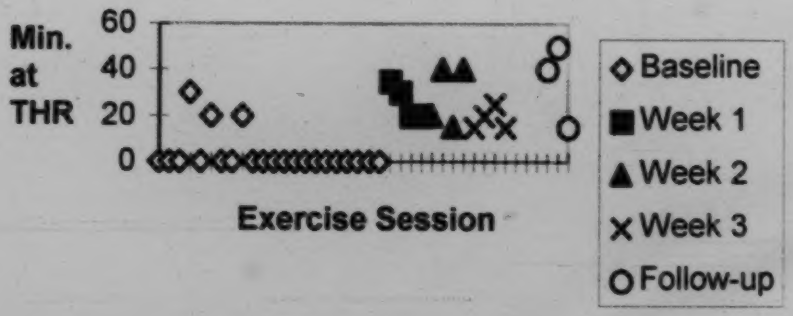
Time Spent Exercising at Target Heart Rate for Informant A1



Informant A2 recorded a stable baseline. There was a definite change in the level of exercise during the intervention. The exercise level did not follow a changing criterion progressing in a step-like fashion. The change of exercise level was maintained during the follow-up probe. A graphical representation of the this informant's exercise behavior is presented in Figure 7.

Figure 7

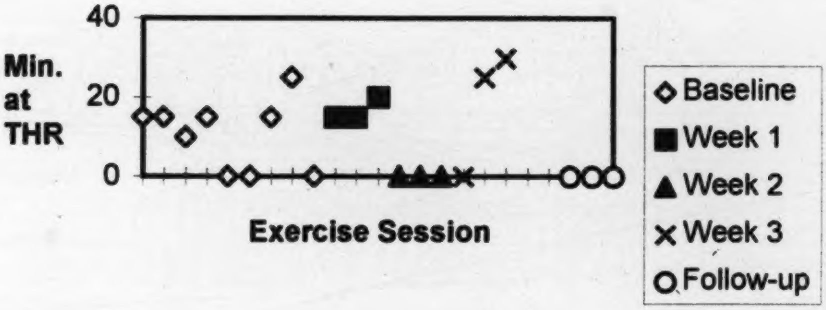
Time Spent Exercising at Target Heart Rate for Informant A2



Informant A3 did not record a stable baseline for exercise behavior. During week one of the intervention stability increased. As the informant participated in physical activity for approximately 20 minutes for each of three sessions. This stability was short-lived, however. His behavior pattern over the three weeks of intervention was similar to the pattern during the baseline. The informant did not record exercise during the eight-week probe. His qualitative reports indicated that he was ill during the week of the probe. A graphical representation of the informant's exercise behavior is presented in Figure 8.

Figure 8

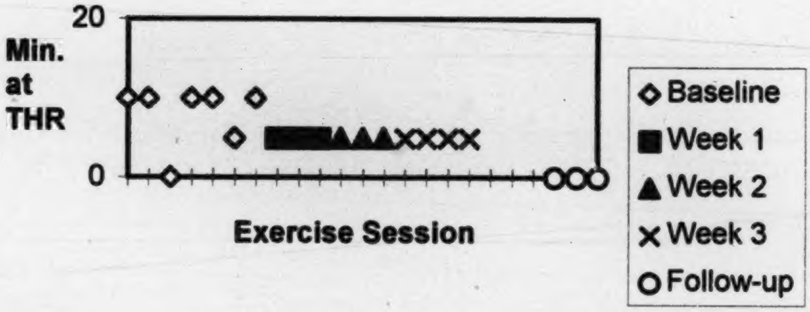
Time Spent Exercising at Target Heart Rate for Informant A3



Informant M1 recorded a stable baseline level of exercise. His qualitative reports indicated that he was commuting by bike during the baseline period, but he did not continue to commute during the intervention. It was a transition period between seasons. There was a drop in level of exercise during the intervention. No effects on his exercise behavior were demonstrated during the intervention. No exercise was recorded during the follow-up probe. A graphical representation of this informant's exercise behavior is presented in Figure 9.

Figure 9

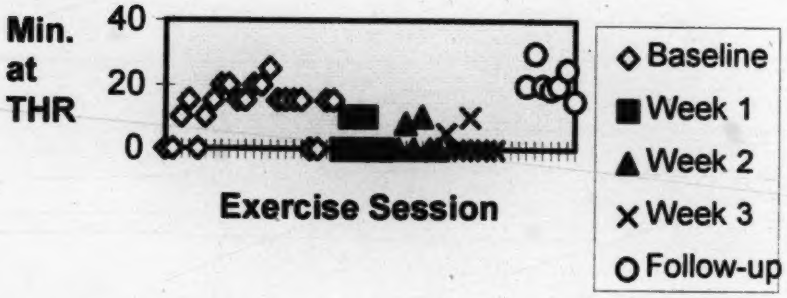
Time Spent Exercising at Target Heart Rate for Informant M1



A stable baseline was recorded by Informant M2, however the validity of the baseline report is questionable in light of the interview information. There was a definite drop in the level of reported exercise during the intervention, but this drop was not supported by the qualitative interviews. A clear positive relationship was demonstrated during the eight-week follow-up. It was clearly an active week. The informant indicated that he had been jogging rather than walking to work, resulting in the increase in intensity. A graphical representation of this informant's exercise behavior is presented in Figure 10.

Figure 10

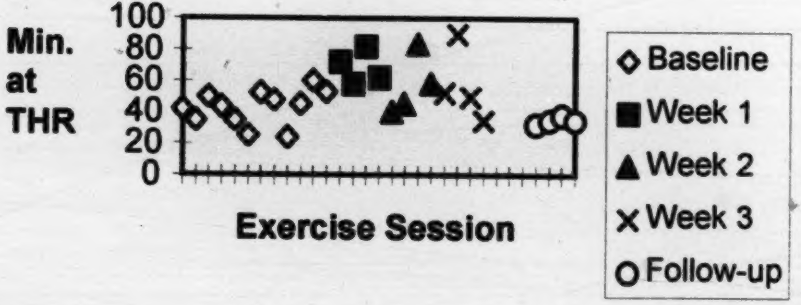
Time Spent Exercising at Target Heart Rate for Informant M2



There was general stability in the recording of baseline by Informant M3. Exercise level was increased during the intervention, but fell following the intervention as indicated by the eight-week probe. The drop in activity was supported by qualitative reports of a busy work schedule during the follow-up week. A graphical representation of this informant's exercise behavior is presented in Figure 11.

Figure 11

Time Spent Exercising at Target Heart Rate for Informant M3



To clarify the change in each informant careful attention needs to be directed at the level of activity undertaken in each phase of the study. To examine the specific level of exercise, the average time spent exercising at target heart rate was calculated and is presented in Table 34.

Table 34
Summary of Exercise Behavior

Informant	*Number of Activity Sessions*					*Number of Weeks in Phase*					*Mean Time Exercising at *THR*				
	BL	**W1**	**W2**	**W3**	**FU**	**BL**	**W1**	**W2**	**W3**	**FU**	**BL**	**W1**	**W2**	**W3**	**FU**
P1	13	3	3	3	4	4	1	1	1	1	5.0	8.0	12.0	15.0	10.8
P2	13	3	3	3	3	3	1	1	1	1	12.6	10.0	19.7	18.3	0.0
P3	4	3	3	3	3	5	1	1	1	1	18.8	30.0	26.7	16.7	27.3
A1	12	3	3	4	3	4	1	1	1	1	0.0	36.7	38.3	26.3	80.0
A2	22	4	4	4	3	5	1	1	1	1	3..2	26.3	28.8	18.8	35.0
A3	9	3	3	3	3	3	1	1	1	1	10.6	16.7	0.0	18.3	0.0
M1	7	3	3	3	3	4	1	1	1	1	7..9	5.0	5.0	5.0	0.0
M2	22	6	7	7	7	5	1	1	1	1	11.8	3.3	2.6	2.1	21.3
M3	12	4	4	4	4	3	1	1	1	1	42.7	68.5	56.5	56.8	35.0

* Target Heart Rate
BL=Baseline, W1=Week 1, W2=Week 2, W3=Week 3, FU=Follow-up

The table summarizes three things: the number of activity sessions each informant participated in during each phase, the number of weeks in each session and the average time spent exercising per session in each phase. Exercise was distinguished from physical activity by stipulating that only physical activity at target heart rate could be logged as exercise. The three measures were summarized in Table 32 for the baseline phase, each of the three intervention weeks and the eight week follow-up phase.

An intervention effect was evident on the duration of exercise for informants P1, P3, A1 and A2, which was maintained through the eight-week probe. An intervention effect was suggested for informants P2 and A3, but the effect was not maintained through the follow-up probe. Informant M2 did not exhibit an intervention effect during the intervention or immediately following the intervention. He did demonstrate an effect at the time of the eight-week probe. This change in exercise behavior was supported by his qualitative report. Informant M1 did not exhibit an intervention effect on his behavior during the length of the study.

Discussion

The discussion to follow "pulls together" the results from the nine informants to comment on the findings relevant to three informants in each of the stages examined during this study. In this study, attention was directed at counseling individuals in the stages of preparation, action and maintenance. Within this discussion, qualitative and quantitative interpretations are combined to provide an in-depth examination of the intervention effects on physical activity behavior. The qualitative interpretations flow from examination of three in-depth interviews as well as the guided recall of both comprehensive and total physical activity. The quantitative interpretations were drawn from examination of exercise behavior measured by a single-subject research design. The discussions of intervention effects, attitudes, beliefs, intervention improvements, advice for others and the long term critique are based solely on the qualitative information. Causal relationships are not inferred as a result of the intervention. Rather the qualitative data demonstrates the individual variability of the intervention and reported patterns of change associated with the intervention. The variability and patterns were interpreted from reports by the informants and supported by the counselor's interpretations.

It should be recognized that there is some discrepancy between the quantitative qualitative data concerning both beliefs and behavior. An argument could be made that the quantitative data are more objective and provide a valid interpretation of the beliefs and behavior of informants. However for a number of reasons more trust is placed in the qualitative results. Prior to moving into a discussion of the results it is critical to acknowledge that the quantitative results provide limited information for discussion, due to limited number of informants and lack of random selection. On the other hand the qualitative results provide a detailed picture of the informants belief and behavior. This discussion is based on the interpretation that the qualitative information provides a clearer picture of the interventions effectiveness. This interpretation is based on the attention to accuracy and depth of the qualitative inquiry. Informants emphasize the qualitative results in this discussion because of this depth of qualitative inquiry, the breath of qualitative measures and the independent confirmation of interpretations. Because of difficulties experienced in qualitative data collection the bulk of discussion is based on qualitative results.

Preparation

Reported intervention effects.

The three individuals in the preparation stage indicated that the intervention had a positive effect on them. In general it was suggested that the intervention increased their awareness of the need to set up facilitators, work around barriers and increase their determination to become active. In terms of stage change there was a variation in movement amongst the three informants. Each informant indicated positive movement along the stage of change continuum. This progress was enough to be interpreted as a change in stage of two of the three informants. These two informants maintained the change in stage one year following the intervention. Although informant P1 indicated that he was more active and had made movement toward action he did not change his stage rating. It was worth noting that informant P3 was the first of several informants in this study to alter his initial stage rating following his baseline period. He changed his classification to the stage of contemplation which he felt was a more honest interpretation of his actual stage.

The comprehensive and total physical activity reports for the three informants in preparation suggest that moderate activity was increased following the intervention and the increased level was maintained through the eight-week follow-up by two of the informants. The two informants who maintained their increase in moderate activity also increased their reports of hard activity. One of those informants continued the hard activity at the time of the eight-week follow-up. In terms of exercise, only informant P3 demonstrated a large change in the time he spent exercising at target heart rate during each session of physical activity that he undertook. Although Informants P1 and P2 gradually increased the time they spent in target heart rate as the study progressed they did not maintain the increases until the eight-week probe of their exercise behavior. In summary it was clear that each of the preparers felt they had become more active following the counseling intervention but the change varied. One increased his moderate activity, a second increased hard activity, but not very hard activity that would sustain a training heart rate. The most dramatic effect was in informant P3 who recognized his inactivity. He progressed from contemplation through preparation and into action. This change was supported by his logging of increased exercise time throughout the intervention and during the follow-up probe.

The fitness changes in these three informants' support their reports of physical activity. Informant P1, who indicated the least change in activity behavior, experienced clinically significant changes in grip strength and flexibility. These changes correspond to his sporadic participation in aerobics classes and recreational physical activity. Informant P2 had several components of fitness that needed improvement or were at unhealthy levels. His primary concern was body composition. There was a positive trend reported in body composition during the follow-up fitness evaluation. Both total skinfold and trunk skinfold dropped. These changes corresponded to his increased hard physical activity. His changes in physical activity may be slow in demonstrating clinical significance due to degree of change he had to achieve to move into a new category of fitness. Slow progress at a consistent rate was the best plan for this informant.

Suggestions for improving the intervention.

There was agreement by the informants that a practical component should be added to the intervention. By this they meant that it would be useful to spend time with the counselor in the gym so as to experience physical activity under supervision. The informants agreed that the program could be streamlined to reduce some of the repetition, although this was not seen as a major problem. The fact that the intervention was part of a study may be responsible for some of the repetition of questioning and measurement. There was variation in the degree of structure desired by the informants. The two informants who reported the more dramatic changes in behavior were happy with the level of direction while the informant who reported less behavior change indicated that a more directive counseling approach would have been more successful.

Reported attitude and beliefs toward physical activity.

Instrumental attitudes were altered, as the intervention progressed, in all three preparers. All the informants indicated a reduction in the perceived costs associated with physical activity. Each of the informants reported changes in their perception of benefits. The most dramatic effect was reported by informants who experienced additional benefits first hand. Less dramatic influences on attitudes were experienced by those who became more aware of benefits and recognized the intrinsic benefits of physical activity.

Effects on affective attitudes were reported by all of the informants in preparation. Each of the individuals recognized a greater perception of enjoyment from physical activity as the study progressed. Informants P2 and P3 recognized additional sources of intrinsic enjoyment. Informants P1 and P2 pinpointed dislikes they associated with physical activity. Informant P2 changed his perception of dislikes. Following the intervention he indicated that he had reduced the importance of many of the negative things he associated with physical activity. The process of changing affective attitudes in these informants seemed to progress from an increased awareness of enjoyment and dislikes to a change in value placed on each of these affects. In some cases attitudes were associated with experiencing new levels of physical activity.

There was consistent change in the control beliefs of the informants in preparation. Reported facilitators increased in all three informants as the study progressed. Not only did the discussion of facilitators increase, it also became more focused. Discussion of facilitation moved from a generic focus toward an individual focus on practical facilitators that would make physical activity more likely. Similarly, the informants narrowed their focus on physical activity barriers to those specific to their personal efforts to become more active.

The degree of social support and discouragement in these three informants varied greatly. A similar trend was evident in changes in normative beliefs as was noted with control beliefs. Recognition of both support and discouragement was reported in these informants. Following the intervention both support and discouragement were more realistically evaluated. This realistic evaluation was reported to be a step towards establishing the most supportive environment in which to become more physically active. In two of these informants increased participation in physical activity dispelled much of the discouragement they perceived. The experience gave them a more realistic perception of social discouragement.

Reported individual or situational Influences.

Two of the three informants in preparation began the study perceiving both individual and situational factors as barriers that reduced their likelihood of being active. These two informants shifted their belief to perceive individual factors alone as the primary barriers to increasing their level of physical activity. Informant P2 who made the most dramatic and sustained changes in his report of hard activity indicated, throughout the study that both individual and situational barriers played a role in limiting his physical activity. He made a statement that was repeated by others in stages further along the continuum. In the statement he recognized that individual barriers play a role but they could be overcome by internal drive.

Reported advice for others.

The most common suggestions by these three preparers for others were focused on finding social support for their participation in physical activity. Suggestions in this vein included finding exercise partners, joining clubs, or participating in team sports. Several comments suggested that individuals be challenged to examine their barriers to activity and work with a counselor to break down those barriers or find ways to work around them. In addition to working with a counselor it was suggested that help working through barriers could be obtained by working with exercise partners with personal experience or making commitments to others to establish a feeling of responsibility. The final concentration of suggestions that were commonly reported by this group of informants highlighted the importance of selecting appropriate physical activities. It was suggested to take activities in which you currently participate and expand participation in them. It was commonly suggested that searching for enjoyable activities was crucial for long term participation in physical activity.

Informant's independent critique.

One year following the intervention two of the three informants indicated that they were in the stage of action. The third informant reported that he remained in preparation but he was more involved in what he termed recreational physical activity than at the time of the intervention. At that point he indicated that he felt the counseling may have been more effective with him if it had used a more directive approach rather than the informational approach that was taken. His heightened level of motivation to participate in physical activity was maintained at the time of his critique. The two informants who remained in action one year following the intervention reported continued changes in attitude toward physical activity. Both indicated an increased value placed on activity and reported that remaining physically active was a priority. Their critique indicated further progress in affective, control and normative beliefs.

Action

Reported intervention effects.

Two of the informants in the stage of action regressed to previous stages on the change continuum following their personal logging of physical activity. During the baseline phase these two informants realistically evaluated the time they spent exercising at target heart rate and recognized that they were not as active as they had perceived when they originally classified their stage. The third of the informants began the intervention in the stage of action but soon after began to question his exercise level. Early in the intervention he related that he was inactive due to fatigue and illness. During the intervention he indicated that his stage of change was more realistically classified as preparation. All of the informants reported being more physically active following the intervention. Informants A1 and A2 both overestimated their physical activity and moved into the stage of action following the intervention, while informant A3 indicated that he was half way to being into the stage of action. In addition to being able to more realistically evaluate their exercise, these informants reported increased control over their situation and more awareness of the barriers and facilitators that influenced their physical activity behavior. More detail on these attitudinal changes was provided in the discussion pertaining to attitude.

The comprehensive and total reports of physical activity suggested that two informants were more active in both moderate and more vigorous physical activity following the intervention and again eight weeks following the intervention. Informant A3 reported increased levels of very hard activity immediately following the intervention. These increased levels remained elevated as compared to the pre-intervention levels but dropped from the post-intervention levels, suggesting his change in activity was short-lived. There was disagreement between his reports of comprehensive and total activity. His contention that he was inactive during the recall week for total activity indicates that his comprehensive levels were a more realistic evaluation. Those reports suggest he was more active in both moderate and vigorous activity at the time of the follow-up interview. In terms of strictly defined exercise, informants A1 and A2 demonstrated a change that was sustained throughout the intervention and into the follow-up period. Both these informants recorded a stable baseline with an immediate change in level of exercise during the first week of the intervention. This data supports the contention that they had unrealistically evaluated their participation in exercise prior to the baseline. The lack of a stepwise progression in level of exercise somewhat limits the establishment of causality in this study, but the immediate and stable change following staggered baseline periods does suggest a possible effect of the intervention. The same cannot be claimed for informant P3. The lack of a stable baseline limits the contribution of this quantitative data. His baseline and intervention phases follow a similar pattern reflecting sporadic physical activity. This data suggests that the informant remained in the stage of preparation throughout the length of the study. In summary there was demonstration of an association between the intervention and physical activity behavior, in two of the informants who originally classified themselves in the stage of action.

There were clinically significant changes in fitness reported in each of the three informants who originally classified themselves in the stage of action. The degree of change varied, but supported the change in activity levels of informants A1 and A2. Their increases in exercise at prescribed heart rate were being demonstrated in positive aerobic trends and a trend toward more healthy body composition. Informant P3 like the other informants demonstrated some changes in muscular fitness but did not show the positive trends or clinically significant changes in aerobic fitness or body composition. A longer duration between the initial and follow-up assessments may have demonstrated larger fitness effects.

Suggestions for improving the intervention.

All the informants in this group suggested that there was a need for continued contact with a counselor. They reported a need for continued fitness evaluation and monitoring. It was suggested that continued counseling could allow establishment of supportive attitudes and discovery of interesting physical activities. Reevaluation of measurable goals and establishment of new goals could support continued motivation. It was suggested that alternate methods for monitoring exercise would add to the intervention. Several informants suggested that they had difficulty accurately assessing the intensity and duration of their activity. Heart-rate monitors were suggested as an alternative method for evaluation of exercise intensity. Although the informants did not enjoy the level of logging activity they were asked to complete, they recognized that it had a positive effect allowing for realistic evaluation of their physical activity.

Reported attitude and beliefs toward physical activity.

The three informants experienced varying degrees of change in their instrumental attitudes towards physical activity. Informants A1 and A2 who made the most dramatic changes in physical activity behavior perceived reductions in their costs associated with activity. The time this change took varied in the two informants. Each of the three informants had an increased perception of benefits associated with physical activity. Specifically three types of changes occurred in perceptions of benefits. Benefits were experienced first hand from increased participation in physical activity. Education on benefits provided additional awareness. Finally, expectations of benefits became more realistic and were tempered by practical experience.

Positive changes occurred in the affective attitude of the two informants who made progress along the stage of change continuum. Informant A3 who failed to report positive stage change during the study also failed to report experiencing enjoyment of physical activity at levels that would be defined as exercise by the terms of this investigation. He made no change in his perceptions about enjoyment throughout the study although he did indicate following the intervention and again during the follow-up interview, that he was searching for activities that he enjoyed. There was mention of increases in intrinsic enjoyment and dislikes associated with physical activity that he could control. These changes were not reported by other informants in the stage of action.

All three informants reported change in terms of control beliefs. Both their perception and the clarity of thought on facilitators of physical activity developed following the intervention. In other words facilitators became more prevalent and specific. In the case of informant A3 his facilitators became more process based rather than being purely focused on outcomes of physical activity. Again Informants P1 and P2 grew in their understanding of their barriers to activity. They reported being able to remove or overcome many of the barriers. In contrast Informant A3 perceived a barrier throughout the study which he was unable to overcome. To a large extent that may have been connected to his failure to initiate and maintain regular physical activity.

All informants who initially indicated they were in the stage of action reported having social support to be physically active prior to the intervention. Various changes to their perceptions of support occurred following the intervention. Informant A2 built more social support by including his wife in his program of activity in addition to pursuing his individual objectives. The other two informants tempered their perceptions of support, recognizing that there were limitations to their support. Their reaction to this realization may have influenced their efforts to pursue regular activity. Informant A1 made some alterations but pursued activities that he enjoyed and would facilitate reaching his objectives. Informant A3 pursued activities that he did not enjoy and highlighted his barriers to activity. In terms of social discouragement both informants A1 and A2 reported sources of discouragement. Following the intervention they were able to reduce it or devalue the discouragement by the time of the follow-up. In contrast informant P3 made no changes in his perceptions of social discouragement prior to the follow-up interview. It would be useful to determine if the lack of change was due to the intensity of the discouragement, the effect of the intervention, or extraneous factors.

Reported individual or situational influences.

Informants A1 and A2 focused on either situational or individual barriers to their physical activity prior to the intervention, stressing one without making connections between the two. Following the intervention these two informants reported recognizing connections between their individual and personal barriers to activity. Much like one of the informants from the stage of preparation these two individuals came to the determination that reducing individual barriers leads to a strengthened internal drive that could facilitate overcoming situational barriers. In contrast Informant A3 never reached that conclusion. Throughout the study he focused on his perception that the only obstacles that needed attention were his internal obstacles.

Reported advice for others.

Two factors were most commonly reported in suggestions for others trying to habitualize physical activity. It was suggested that getting counseling was an important step. Counseling had provided them with the initiative to log physical activity as a reality check and the opportunity to examine their personal barriers from and desires towards physical activity. In that same stream of thought other suggestions were to find supportive exercise partners, or join active groups where advice and support would be available. The importance of a fitness evaluation was the second contention. In addition to logging activity the informants believed it was good advice to others to have a fitness evaluation and a medical as sources of motivation.

Informants' independent critique.

Two of the informants who originally indicated that they were in the stage of action made changes in their exercise levels following the intervention. Those individuals, Informants A1 and A2 continued to progress in stage following the eight-week follow-up interview. One year following the intervention they both indicated they were in the stage of maintenance. They reported habitualizing physical activity and overcoming many of the barriers that interfered with participation in regular exercise. In addition each of them reported establishing more facilitators which served to foster the maintenance of physical activity. Informant A3 had reduced his participation in physical activity in the year following the intervention. He had maintained a positive attitude towards physical activity since the end of the intervention. Due to a recognition of physical changes from his reduced activity, he was experiencing an increased desire to return to levels of activity he had reached following the intervention and to make activity more of a regular habit. If counseling were to be continued at the time of the critique, the contrasts between his attitude and the attitudes of the two informants who had progressed into maintenance would provide input for continued counseling. His classification in the stage of contemplation may be more realistic than his original classification in action prior to the intervention. He could benefit from more attention to developing an attitudinal base on which to build behavior change.

Maintenance

Reported intervention effects.

All of the individuals in maintenance indicated that the intervention had been effective. In general the informants reported that the counseling confirmed their beliefs and attitudes concerning physical activity. The program acknowledged their activity, but provided modifications to improve their program. All the informants reported that the intervention provided education about physical activity and awareness of additional benefits. Although each of these informants reporting being in the stage of maintenance at the beginning of the study, this classification was suspect in informants M1 and M2. Their level of activity reported in the qualitative interviews do not meet the criteria for activity to be defined as exercise. The intervention had positive effects on the exercise maintenance of informants M2 and M3. There was no room for improvement in stage classification, but both of these individuals made changes that would support maintenance of regular activity. Informant M2 managed to increase activity intensities that would achieve his objectives. Informant M3 recognized some physical limitations that could restrict his activity and heightened his awareness of exercise compulsions and their effects on the long term benefits of activity. Although Informant M1 reported several positive changes in his attitude following the intervention, he had difficulty maintaining his activity due to seasonal changes and serious health problems.

The comprehensive and total reports of physical activity support the interpreted effects of the intervention. The seasonal change was reflected in the reports of informant M1. He perceived reduction of his more vigorous levels of activity and his moderate activity during the intervention. The eight-week follow-up suggested some rebound in the levels of moderate activity. Informant M2's qualitative information indicated that he was exercising more intensely by the time of the follow-up interview. As well his comprehensive and total reports demonstrated an increase in vigorous activity. Informant M3 supported stable levels of activity with his reports of comprehensive and total activity. Levels of exercise as evaluated by the single-subject data tell a specific story for each of the informants. The exercise levels of both informants M1 and M2 do not support their original classification in the stage of maintenance. Some instability in the baseline and low levels of duration suggest that these informants belong in lower stage classifications. The quantitative data did support the changes reported during interview by these two informants. Informant M1 did demonstrate a decline in exercise while informant M2's data supported his reported increases in exercise intensity during the follow-up probe. Informant M3 logged his exercise consistently during the study. There was a rise in the level reported during the intervention. In general his quantitative reports support maintenance of exercise with some fluctuation demonstrated by events in his life that affected his exercise behavior.

The fitness assessments of these three individuals are consistent with the changes they have made in activity behavior. Informant M1 demonstrated declining trends and clinically significant decreases in many of his components of fitness. This was consistent with his decline in physical activity. Informant M2 demonstrated little change in his level of fitness. His late change in behavior reported only during the follow-up interview did not have the time to lead to changes in his fitness. Informant M3 maintained stable fitness throughout the study. This was consistent with his long term maintenance of physical activity.

Suggestions for improving the intervention.

There was a wide range of suggestions to improve the intervention reported by these informants. There was agreement that a positive aspect of the intervention had been its "soft-sell" approach. Informant M3 who had been maintaining physical activity at high levels, stressed the importance of establishing a network of support for physical activity. He suggested that the intervention may help change behavior by working with individuals to find activity partners, mentors, or active groups.

Reported attitude and beliefs towards physical activity.

The instrumental beliefs of the three individuals originally classified as maintainers was stable throughout the study. The three individuals reported maintaining their perceptions of costs and benefits associated with physical activity on each of the qualitative interviews conducted.

There was a substantial degree of change in the affective attitude of only one maintainer. Informant M1 perceived more sources of enjoyment following the intervention. The other informants reported stability in their perceptions of enjoyment. Reports of displeasure remained stable throughout the three interviews by each of the informants.

There were few changes in the barriers to physical activity perceived by any of the maintainers involved in the intervention. This was not true for the perception of facilitators for physical activity. The list of facilitators was expanded following the intervention. In addition to increases in the number of facilitators reported, the discussion of facilitators was expanded upon. Each of the informants focused their attention to facilitators on a more personal level following the intervention. In this way facilitators were individualized by the informants to meet their individual needs. These changes relative to facilitation indicated a change in control beliefs in each of the three maintainers. This increase in control may lend stability to the physical activity behavior of these individuals.

Although each of the informants reported social support for physical activity prior to the intervention, there were changes in the normative beliefs of each informant. Support was more fully described and clarified following the intervention. Informants M1 and M2 more realistically evaluated the degree of support they received. Each of them believed that they would be more active if social support was strengthened. Support that was less conditional or more active would improve the regularity of their activity. Informants M2 and M3 expanded their discussion of social discouragement during the follow-up interview. From this increased discussion informant M2 recognized an increased personal resistance to discouragement, while Informant M3 recognized a limit to his support. Both of these can be perceived as positive realizations. Informant M2 could use this resistance from discouragement to increase his exercise intensity, while Informant M3 could temper his concerns about addiction with exercise by considering the perceptions of people who expressed limited levels of support for him pursuing increased levels of exercise.

Reported individual or situational influences.

Prior to the intervention informants M1 and M3 focused on individual barriers that might interfere with maintenance of physical activity. Informant M2 began the study with a completely situational focus in this regard. Following the intervention these concentrations were tempered to some extent in informants M1 and M3. They both began to discuss the need to strengthen individual motivation to overcome situational barriers. This change in perception continued to a greater extent into the follow-up interview. These changes in perception did not change in informant M2. He maintained the perception that all the barriers to his activity were situational. If his situation was different he would be more active. The change in perception of barriers in two informants adds support to the contention that recognition of both situational and individual aspects of motivation play a role in initiating and maintaining physical activity. With a concentration on only one aspect of the motivation the likelihood of being active was reduced.

Reported advice for others.

By far the most prevalent suggestion to others was focused on finding social situations or relationships that provide support for physical activity. Suggestions in this theme included being involved in counseling, being active with partners or active groups and finding an experienced mentor to help with both practical skills and motivation. These suggestions were all focused around establishing a supportive non-threatening environment. All the informants highlighted the importance of finding activities that matched their objectives, were enjoyable and could be pursued across the seasons. Selection of the best activities was viewed as critical to the maintenance of regular physical activity.

Informants' independent critique.

Two of the three informants remained in maintenance one year following the intervention. The informant that had relapsed had had significant health problems which required surgery. His activity was limited for a period of convalescence and rehabilitation. All the informants remained committed to participation in physical activity. All the informants recognized continued positive changes in their attitude towards physical activity.

Conclusions

In this section the reported influences of the intervention on the informants originally categorized in each stage will be reviewed. The theories that provided the structure for the counseling intervention will be revisited in relation to the demonstrated effects. Finally modifications to the intervention will be suggested based on the comments of the informants and interpretations of the research findings.

Prior to pursuing these concluding comments it is wise to revisit the nature of this research. The methodology employed included both qualitative and quantitative tools of inquiry. The interpretations are based on qualitative interviews, with collateral support from quantitative tools. The interviews asked the informants to comment on intervention effects, physical activity behavior and beliefs, stage movement and suggest advice for others striving to habitualize physical activity. A single-subject design was planned to investigate the effects of counseling intervention on strictly defined exercise. The single-subject design lacked control due to problems with accuracy and compliance to both criteria and baseline measurement. Therefore information from the single-case quantitative data was added to the qualitative information. Rather than being presented as single-case quantitative data it was presented as a series of case studies of individuals at different stages of behavior change.

The nine informants reported that the intervention was effective. A number of measures support this contention. Perceived effects can be broken down into behavioral change and change in beliefs. A broad measure of effect was indicated by change in stage. The changes in stage need to be examined from where the informants began the study. Two of the three informants originally classified in preparation made a positive move of at least one stage during the duration of the study. Two of the three informants who began in action made a positive stage change. Two of the three original maintainers continued their maintenance with some measure of improvement noted.

Of particular interest was the change in perceived activity level of many of the informants following the baseline phase. Three informants reclassified their stage to an earlier stage immediately after completing the baseline phase. This was prior to the intervention. Another revised his classification during the intervention. These changes in perception were supported by the qualitative reports of exercise. In two additional cases the qualitative interview combined with the quantitative self-report of exercise cast suspicion on the classification. These interpretations suggest that six of the nine informants were unable to accurately rate their stage of change behavior. This was most prominent in the stage of action where no informant accurately rated his stage of behavior. These findings suggest a need to closely examine behavior as an adjunct to self-assessment of physical activity. This interpretation was supported by the qualitative comments of several informants who indicated the importance of working with a counselor to realistically evaluate physical activity. From the perspective of a counselor, it was critical to pay particular attention to the realistic self-evaluation of informants' behavior and beliefs. Neither was discrete in terms of physical activity. The degree of direction needed for informants may be determined by how realistically behaviors and beliefs are perceived. As Miller and Rollnick (1991) suggest part of the role of counselors is to develop or create awareness of discrepancy, as a precursor to developing motivation. When realistic evaluations of activity level and beliefs toward activity are perceived the counselor can negotiate goals with individuals and provide guidance or advice when required.

Behavioral changes can be further broken down into changes in moderate physical activity, intense physical activity and strictly defined exercise. All but one informant reported positive change in physical activity following the intervention. Individual variation took place in what intensity of physical activity was changed and how long change was sustained. In general, increases in both comprehensive and total physical activity were supported by the logging of strictly defined exercise and fitness changes. The informants who demonstrated a clear change of behavior can be placed in one of three categories: those who demonstrated a change during the intervention and maintained the change through the eight-week probe (P1, P3, A1, A2), those who demonstrated a change in physical activity during the intervention but failed to maintain the increased exercise level until the eight-week probe (P2, A3) and finally the one individual who exhibited a change only by the time of the eight-week follow-up (M2). The fact that his change was related to the intervention was suggested by his third qualitative interview.

One informant demonstrated no positive change in exercise behavior during the study. His classification as a maintainer was suspicious based on logging of strictly defined exercise. His qualitative reports indicated a relapse from maintenance due to seasonal variation in his program and serious illness.

The changes in physical activity of all informants were consistent with the changes in fitness indicated by the follow-up evaluation. For example the sporadic change reported by informant A3 was consistent with his limited change in fitness. A fitness evaluation one year following the intervention would have been useful to provide additional support for the informants' indications of long-term behavior changes.

It was valuable to demonstrate changes in beliefs and attitudes toward physical activity during the intervention and to examine the stability of these changes over the long-term. From the qualitative indicators of attitude and belief change, it can be suggested that beliefs toward physical activity changed in all informants during the intervention. The informants in several cases suggested that the changes in beliefs occurred because of their involvement in the counseling intervention. A common theme stood out in regard to changing beliefs demonstrated in each of the four belief components. Four steps seemed to have taken place that improved the opportunity for habitualization of physical activity. The steps were: recognition of their beliefs, specific and realistic evaluation of influences on beliefs, change in the situation or perception of situation and finally experience of the changed beliefs during physical activity. The changes in beliefs seemed to follow the same pattern or trend as that of changing exercise behavior. In changing exercise behavior informants discovered the definition of exercise, logged the behavior, realistically evaluated the behavior, made a plan to change and finally experienced the change. These suggested steps demonstrate an influence of beliefs on behavior as well as the reverse effect. In other words it was important to experience behavior change as part of the process of changing beliefs.

It would provide insight to make connections between changes in beliefs and associated changes in activity behavior. A change in beliefs occurred in all informants at some point during the intervention. Informants that made quick belief changes did not necessarily make behavior changes quickly. Those that made changes in all the different types of beliefs (i.e., instrumental, affective, control & normative) did not necessarily make greater changes in activity behavior. For example informant P1 reported changes in all four belief components by the third week of the intervention but made no change in his stage classification. In contrast informant A1 changed only three aspects of his beliefs, but he made a large jump in stage classification, moving from precontemplation to action by the eight-week follow-up and on into maintenance one year following the intervention. The qualitative interpretations suggest that changes in beliefs are necessary, but not sufficient, to change behavior. There was some suggestion that changes in beliefs led to behavior changes in very specific ways. The key to counseling success may be to change those beliefs that are most likely to change physical activity behavior. For example, informant A1 made changes in the instrumental and control beliefs. His work to establish a time for activity facilitated his change in behavior. This change led to continued changes in beliefs. In contrast informant A2 made a change in normative beliefs. Gaining the involvement of his spouse and finding a time for activity lead to changes in all aspects of beliefs by the follow-up evaluation. These two informants both ended up in maintenance one year following the intervention but their changes in beliefs began along different paths. The key to a counseling intervention may be to work with individuals to discover their belief path to change activity behavior.

Specific changes in beliefs may provide guidelines for application of counseling in realistic environments. For example thoughts about the nature of perceived barriers to physical activity may provide a guide to understand the degree of independence informants have obtained. Informants were asked to comment on the nature of barriers interfering with their participation in physical activity. There was a tendency for informants who were adopting more regular patterns of physical activity to recognize the importance of both situational influences and individual barriers to physical activity. Many individuals began the intervention focusing on the individual or situational barriers but as the intervention progressed it was commonly reported that individual and situational barriers became integrated. Statements were made that suggested that situational barriers were inevitable but with individual motivation the situational barriers could be reduced or ways around them could be mapped. The importance of situational barriers was not downplayed, rather it was suggested that individual motivation and individual attention to the situation could result in a more active lifestyle. In concise terms, it was suggested that the individual and their situation are inseparable. When individuals recognize the control they have over their situation it may be a sign that counseling has reached a point where individuals can independently continue their progress towards the stage of maintenance. At this point individuals seem to be demonstrating the ability to retain the motivating power developed during the intervention (Janis, 1983). They are at the point where independent work towards change may promote internalization of their motivation.

The theories upon which this counseling intervention was developed should be revisited at this point. Several concerns emerged about the use of stage theory as a guide to applying individual counseling to promote physical activity (Prochaska, 1979; Prochaska & Marcus, 1994). Clearly the accuracy of stage categorizations by individuals was in question. Prior to logging their exercise behavior three of the nine informants misclassified their stage behavior. Their discrepancies were reported by the informants after a baseline period logging exercise frequency, duration and intensity. Another informant altered his classification early in the intervention. In the case of two additional informants the objective measurements of exercise behavior did not support their self-reported classification at the maintenance stage. In short, six of the nine informants who participated in this study reclassified their placement on the stage of change continuum. When using stage classification to apply tailored counseling to individuals based on their stage placement it is important to adapt the method of stage rating. Rather than relying on individuals to self-rate their stage, logging of exercise should be integrated as a method of realistically evaluating the activity behavior of individuals. This process of evaluating stage, rather than just being a method to determine the starting point for the intervention, might also serve as an initial intervention contributing to a change in beliefs. Because in two cases the informant's rating of stage was questionable, it seems prudent for counselors to realistically evaluate the individual's self-rating of stage behavior. As suggested by Janis (1983) it is part of the motivating role of counselors to make directive statements and recommendations. This philosophy was expanded by Miller and Rollnick (1991) who indicate a role of counselors to create and amplify discrepancies as a means of motivation. The comments of informants and the counselor's interpretations support these recommendations.

This intervention research provides support for the practical utility of the basic frameworks of short-term counseling (Janis, 1983) and motivational interviewing (Miller and Rollnick, 1991). Judging from informants' comments, the three critical phases of short-term counseling were integrated successfully in the intervention. Qualitative reports praised the use of a "soft-sell" approach which elicited commitment rather than requiring change. Many of the informants stressed the need to retain motivating power and promote internalization. The principles of motivational interviewing integrated into the intervention were supported by informants' qualitative interviews and the counselor's interpretations. An emphasis on personal choice and responsibility was combined successfully with objective counselor evaluation and development of discrepancies. The intervention was able to mesh specific counseling principles and strategies with the developed strategies and goals for change created by the individual. In these ways a balance was struck between directed counseling and independent motivation.

Based on the qualitative suggestions of informants, the counselor's interpretations and the strengths and weaknesses of the intervention several suggestions can be forwarded as modifications to the counseling intervention. These suggestions include:

- An examination of pre-counseling behavior by logging physical activity and exercise prior to having informants self-evaluate their stage of change. This serves as a way for informants to gain a realistic perspective of their activity level.

- Using both the informant's self-classification of stage and the counselor's interpretation of activity behavior as a guideline for application of stage-specific counseling interventions.

- If appropriate, build practical experiences into the intervention. The counselor can work through physical activity experiences with the individual.

- Use heart-rate monitors and pedometers to objectively evaluate physical activity behavior prior to, during and following interventions. Objective evaluation of behavior is critical as a research tool, as a tool for individuals to monitor safe activity and as a motivational tool.

- Tailor the degree of direction provided by the counselor to the needs of the individual receiving counseling, considering both the individual's requests and the counselor's interpretations of the realistic needs for direction.

- Monitor changes in attitudes and beliefs as a means of determining the appropriate time for phasing out the counseling interventions so as to enable the individual's self-directed, intrinsic motivation to take over.

- Based on changes in both beliefs and behavior continue stage appropriate counseling as individuals move through each of the stages of behavior change. If continued contact is not practical, establishing other motivating relationships and the possibility of future contacts to retain motivation developed during the intervention.

- The intervention should devote more attention to three activities: 1) The establishment of measurable goals, 2) Discovery of enjoyable, satisfying physical activities that lead to the achievement of negotiated goals, 3) Working with individuals to establish networks of support, active partnerships, mentors, or participation in active groups.

- Further refine the use of multiple measures of physical activity to gather information on the panorama of changes in an active lifestyle, moderate activity and strictly defined exercise.

The intervention was associated with movement along a continuum of change towards the maintenance of long-term physical activity. The positive influences of this intervention, although not substantiated by rigorous controlled empirical evidence are supported by the impressions gained from the qualitative interviews and by the informants' independent critiques. This provides valuable insight into how counseling may assist individuals at different stages of behavior change to pursue their physical activity goals. The in-depth information provided by the informants in this investigation emphasized the complex nature of behavior change. Facilitating change in physical activity behavior can be aided by relying on theoretical perspectives such as the stage of change theory for the development of specific change interventions.

As outlined in the modifications above, the classification of physical activity behavior is not a black or white process. Physical activity behavior is complex and is not reduced effectively to assessment in discrete categories. As compared to smoking behavior, more attention must be paid to measurement of physical activity behavior by both the informant and the counselor if stage is to be realistically evaluated for application of stage specific counseling interventions. Further research attention should be directed at measurement of physical activity and the application of counseling interventions with varied target groups. This study provides a framework for future counseling interventions. Hopefully it will serve as a guide for practical interventions and as a launching point for further clinical investigations of adherence to regular physical activity.

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CHAPTER 4

General Discussion and Conclusions

Introduction

In this final chapter the studies presented in the two previous chapters will be discussed as a unit of research, relating the studies to each other and to the field of physical activity psychology upon which the practical counseling intervention was based. First the two studies will be considered together to provide recommendations for physical activity counseling and motivation specifically and health promotion in general. Next, research implications will be suggested based on the findings of these two studies. Finally recommendations for continued research directed at promoting health will be forwarded.

The counseling interventions applied as part of the current studies had a common theoretical base, that being the contention that particular attention must be applied to meet the salient needs of the individual to facilitate effective physical activity behavior change. An eclectic mix of theories guided the design of the interventions. From stage of change theory (Prochaska & Velicer, 1997) the suggestion was adopted that interventions for behavior change of those in the earlier stages concentrate on changing their beliefs toward physical activity. In study one the intervention was focused on using primarily cognitive tools as a means of establishing the tendency to become active. An example of such a tool would be the decision balance technique. The concentration of the intervention for study two was based on the Prochaska and Velicer's (1997) recommendation that in the later stages of change, interventions should concentrate on utilizing counseling tools to influence behavior. An example of such a counseling action might be reviewing successes and failures and then planning for continued success. From the short-term counseling model (Janis, 1983) counseling in both studies utilized the concept of three critical phases. The interventions strove to develop motivation, use the motivation to change behavior and maintain an internal and independent motivation. From the motivational interviewing model (Miller & Rollnick, 1991) the concept of involving both directive and non-directive counseling was integrated into each of the two interventions.

Results and Suggestions for Future Counseling Interventions

All the informants across the two studies indicated that the intervention had a positive effect on them. However the target and degree of the effect varied among informants. Target was defined as the type of physical activity or the aspect of beliefs on which effects were demonstrated. The degree and target of change were demonstrated in close examination of beliefs and behaviors by both qualitative interviews and quantitative logging of activity behavior. In study one, with the exception of one individual in preparation, the activity changes reported by informants were supported by changes in the beliefs of informants. The success of change in stage classification was not as consistent. Two of the preparers failed to make positive movement along the stage continuum.

Although the intervention focused on behavioral processes of change in the second study, positive changes in beliefs toward physical activity were reported by each of the informants. The changes in behavior of informants in the later stages of change are difficult to connect back to general changes that occurred in beliefs. The qualitative interpretations suggest rather, that fine tuning of the informants' beliefs were associated with changes in moderate activity, strictly defined exercise and in some cases, stage of change classification. In contrast, the quicker or more dramatic belief changes were associated with more rapid and dramatic changes in behavior for those informants in study one who were in the three primary stages. This may confirm the need to pay particular attention to developing beliefs that predispose informants to be physically active in the early stages while just fine tuning specific aspects of beliefs for those in the later stages. The closer informants are to either end of the stage of change continuum, the clearer the direction counseling should take. For those in precontemplation the focus needs to be on establishing beliefs which will facilitate initiation of activity. For those on the opposite end of the continuum, in maintenance, the focus should be on optimizing behaviors to continue maintenance. Decisions concerning the amount of counseling attention to be dedicated to an individual should be based on the individual evaluation of a counselor and negotiation with the individual. The value of spending time counseling may be guided by stage placement. The amount of attention dedicated to an individual may need to increase from precontemplation through contemplation, with a peak in preparation and a reduction of the duration of counseling through action and into maintenance. Those nearer to the center of the stage continuum need the most attention due to the focus required to deal with changes in both beliefs toward physical activity and to the activity behavior itself. In short, counseling increases in value as the likelihood of having an effect increases. Then as the opportunity for independent success grows the value of individual counseling decreases. The interpretations of these two studies considered together suggest that moving through the stages fits well with the counseling approach forwarded by short-term counseling (Janis & Mann, 1982). During the early stages motivating power is developed. The motivation is used to initiate change during preparation and action. In later stages of action and maintenance the objective is to internalize and sustain the motivation to continue physical activity.

Better success was reported in influencing the physical activity behavior of preparers in the second study than in the first. Several adaptations had been made to address the weak influence on behavior in the first intervention. Logging of strictly defined exercise served as a research tool in the second study, but also served to compel informants to realistically evaluate their physical activity. This provided the opportunity to encourage reflection by informants and allowed the counselor to amplify discrepancies between real and perceived activity as a step towards internalizing the motivation to be active. Thus a base for direction and advice was provided by the counselor as suggested in the motivational interviewing model by Miller and Rollnick (1991). With informants coming from a realistic perspective they seemed able to develop more realistic goals on which to base strategies to increase motivation for physical activity. In addition to the logging of exercise multiple measures were applied to investigate various levels of physical activity. In addition to acting as a research tool, this investigation added to the informants' attention to their behavior. Several positive points relating to this awareness came from the qualitative interpretations. Increases in moderate activity were recognized by informants as a positive change and as a means to integrating more intense levels of physical activity. There was a desire in several of the informants in study one to report their changes in moderate levels of activity, regardless of the fact that reports of moderate activity were not directly requested as part of the qualitative interviews. It was suggested by informants in each study that anyone trying to increase their physical activity begin by becoming more active. They promoted activities like climbing stairs, moving at work and walking to work as positive experiences. Starting from activities that were already part of their routine, it was suggested that the frequency, duration and intensity could be adapted to lead to more regular exercise. This suggestion should be integrated as a tool for counselors to apply as a means of motivating others. Not only does moderate activity contribute to health as suggested by Dunn, Marcus, Kampert, Garcia, Kohl and Blair (1997), but it can enhance the motivation of clients in various stages of adopting more intense physical activity.

Valuable information is provided by the attempts of informants to classify their stage of behavior in the two studies. Insights are provided for those who intend to apply specific interventions based on the transtheoretical theory (Marcus, Simkin, Rossi & Pinto, 1996). There was a large degree of misclassification of stage by informants in each of the studies. The difficulty in classification occurred in each of the stages from preparation to maintenance. The misclassification was recognized by most informants immediately following the baseline logging of physical activity, however, in some cases recognition of a discrepancy took some time, only being discovered during the intervention. In some cases misclassification was not recognized by the individual informant, but reports of activity from the logs of interviews indicate a problem with the accuracy of stage classification. These interpretations highlight the importance of building a period of logging physical activity into counseling interventions. The logging of physical activity in the second study served to develop a more realistic perception by the informants of their activity level.

Four lessons have been suggested by a group of authors for accurately evaluating stage of change (Richards-Reed, Velicer, Prochaska, Rossi & Marcus, 1997). The first lesson is to select a discrete behavior. "The more explicit the definition the more accurate the data". The definition used in the current research was as follows: "Regular exercise is defined as participating in exercise three or more times per week for at least twenty minutes each time". This definition may seem to describe a discrete behavior, but it fails to satisfy the second lesson proposed by Richards-Reed et al. (1997). There was a failure to adequately describe the criterion as a means of further clarifying the definition. Frequency and duration were well described but there was a failure to adequately establish a criterion for the intensity of activity. For the logging of activity during baseline an intensity criterion was added. At that point the informants were asked to log the time spent during each session of activity at a prescribed target heart-rate. The imposition of this criterion served to amplify the discrepancies in behavior previously reported. The third lesson suggested by Richards-Reed et al. (1997) focuses on the ability of informants to self-assess each criterion. Criteria such as frequency and duration are distinct for vigorous exercise but more difficult to judge for lifestyle activity where physical activity is done for short periods, several times per day. Even more difficult is the accurate self-evaluation of exercise intensity (Hudec, 1991; Blair & Connelly, 1996). This difficulty was reported by several of the informants participating in the current studies. The contention supported by the interpretations in these two studies is that physical activity behavior is rarely a discrete behavior. In other words physical activity is difficult to clearly define and measure. Realistic evaluation of stage is heightened by logging physical activity and by the evaluation of counselors experienced with stage interpretation and evaluation of exercise intensity. Physical activity is not as explicit a behavior as smoking where the number of cigarettes smoked can be easily defined (Richard-Reed et al., 1997). For application of interventions focused on changing physical activity behavior, experience and objective evaluation of physical activity should be part of the intervention. Through the use of objective monitoring and the advice of a counselor, individuals can develop the skills to realistically self-assess their behavior. The final lesson suggested by Richard-Reed et al. (1997) is selecting the best format for evaluation of stage. The questions need to be asked in such a way that the individual can accurately place themselves in to the proper stage. They suggest using a true/false or 5-choice response format for the staging algorithm and including longer definitions of vigorous exercise with appropriate examples of activities. In their example of a long definition they stated: "Exercise includes activities such as brisk walking, jogging, swimming, aerobic dancing, biking, rowing, etc. Activities that are primarily sedentary such as bowling, or playing golf would not be considered exercise." In summary the recommendations of Richard-Reed et al. (1997) are to: start with a well defined behavior, suggest criteria to guide the behavior, provide measurement criteria that individuals can judge and use examples of the behavior as a guide for self-evaluation. In addition to these suggestions, three additional guides for improving the accuracy of stage evaluation arise from the current studies. Individuals should log their behavior to support realistic evaluation of physical activity and stage of change classification. The use of pedometers and heart-rate monitors adds objectivity to evaluation and can serve as teaching tools. Counseling should serve to amplify discrepancies not recognized by individuals as they self-evaluate their physical activity behavior and stage of change. In the spirit of Miller and Rollnick's (1991) model of motivational interviewing, the direction should come from the client. However, when discrepancies limit motivation the role of a counselor is to provide appropriate advice and feedback including amplification of such discrepancies.

The use of multiple measures of physical activity facilitated the motivational process by providing information to the informants and the counselor. The only measure of behavior in the first study was the stage of change classification, which was only an indirect evaluation for informants in precontemplation, contemplation and preparation. Without solicitation, informants in study one reported increased levels of moderate activity and an interest in evaluation of both their physical fitness and activity. In the second study multiple measures of behavior supplemented the evaluation of stage. For informants in preparation, action and maintenance an intensive interview was conducted to gain insight into the informants' physical activity at a variety of intensities. This interview was added to the second study based on reports of increased moderate activity by informants in the initial study. It was an attempt to more sensitively examine changes across the spectrum of physical activity. A comprehensive activity assessment asked informants to recall their general participation in moderate and vigorous activity. A seven-day recall of activities at various intensities was conducted with each interview. Both these measures were presented as ways of quantifying physical activity habits and detecting changes in activity over time (Sallis, Haskell, Wood, Fortmann, Rogers, Blair & Paffenbarger, 1985). These measure provided detailed information about the informants' activity from the lowest intensities to the highest. Finally, as part of the quantitative design informants were asked to log their total time exercising and the time spent exercising at target heart rate. This followed the recommendations for single-subject research methodology, having frequent measurement of overt behaviors (Kazdin, 1982, pp. 26).

The degree of control maintained by the single-subject design was limited by difficulties with accuracy of physical activity measurement and compliance with criteria set for behavior change. In a previous study a single-subject research methodology was applied with great accuracy of measurement and compliance with physical activity criteria set by the counselor (Hudec, 1991). Two factors distinguish this previous research from the present study. In the previous research the informants were law enforcement officers. It might be assumed that these individuals were more compliant with the criteria because of the nature of their profession and the personality factors that guided their choice of law enforcement as a career. The second factor that distinguished the previous research from the current research was the use of heart rate monitors with the capacity to record up to eight sessions of exercise and download the information to a personal computer. The monitors may have the effect of aiding the accuracy of monitoring intensity and duration. In addition they may have had the effect of influencing the honesty of self-reported activity, due to the fact the informants knew their activity was being monitored. The informants in the two current studies suggested that heart rate monitors would be useful in counseling interventions. This suggestion should be taken seriously and incorporated as part of counseling interventions and as an aid to maintaining control in changing-criterion, single-subject research methodologies.

Informants in the second study reported both positive and negative effects of the intensive evaluation of physical activity. When asked what changes they would suggest as changes to the intervention it was commonly reported by informants that they would appreciate reduction of the repetitive measurement of physical activity. Conversely positive effects of the intensive measurement were reported. For many of the informants a detailed evaluation focused their attention on physical activity. Positive effects were reported from this awareness. The primary effect reported was the development of a realistic perception of activity level and of beliefs toward physical activity. This realistic evaluation of activity level served to motivate several informants to establish goals to become more active. Beliefs were also positively affected by the realistic evaluation of activity. For example, several informants reported recognition of many ways that they were active at moderate levels. They were able to use their current activities as facilitators of more intense levels of physical activity. The counselor was able to use awareness of various levels of physical activity as a counseling tool. Moderate activity and cumulative activity could be promoted. Positive feedback could be provided for those who increased activity but failed to meet the criteria threshold to achieve stage change. When activity levels failed to meet the goals that would lead to achievement of their long-term objectives, discrepancies could be displayed for informants. This provided a realistic base for provision of directive statements and recommendations (Janis, 1983), or for clarification of discrepancies (Miller & Rollnick, 1991). In summary the measurement of a spectrum of activity provided valuable information to the informants and the counselor. Care needs to be taken to gain the benefits of repeated measurement without overwhelming clients with a barrage of measurement. The complex nature of physical activity behavior change is more accurately examined when those behaviors are monitored in detail greater than that provided by the stage of change model.

There are several specific improvements that can be integrated into an individual counseling intervention to improve its clinical effectiveness. Based on informants' suggestions and the counselor's interpretation of the qualitative and quantitative data from the current studies, practical adaptations should to be made to counseling interventions. For those in the first two stages of physical activity change, more time should be spent working with informants to explore activities they would perceive as enjoyable and gratifying. The importance of establishing beliefs to facilitate behavior change should be stressed more in the first two stages. Changes in moderate activity or cumulative activity should be promoted as positive ends in themselves and as "stepping stones" for initiation of more intense exercise. For informants in preparation, their history of physical activity should be explored to look for facilitators and barriers to future physical activity. Informants in preparation, action and maintenance suggested that future interventions devote more attention to the establishment of measurable goals, discovering enjoyable and satisfying physical activities and the establishment of supportive networks including activity partners, mentors, or active groups. The development of social support was a concern which informants indicated as a need for future intervention strategies. Specifically two tasks were highlighted as important for development of social support. First, informants need to be able to realistically assess sources of social support and discouragement. Second, techniques for developing social networks, including supportive mentors, role models and fellow exercise adopters, need attention. The use of objective measures of physical activity such as pedometers or heart-rate monitors could provide a teaching tool for informants initiating or attempting to maintain physical activity. At no stage were informants immune to problems in realistically monitoring their physical activity.

Research Implications

The findings of the two studies provide support for the clinical effectiveness of individual counseling interventions based upon stage of change theory and two models for counseling interventions (Prochaska, DiClemente & Norcross, 1992; Janis, 1983; Miller & Rollnick, 1991). The combination of designs and the multiple measures of both beliefs and behavior change provided a wealth of data on which to base interpretations and conclusions. One strength of the research was the long-term follow-up used to investigate the perceived effects of the intervention. Informants in study one were followed-up one and a half years following the intervention. In study two there was a follow-up one year following the intervention. Overall 11 of the 16 informants (69%) maintained higher stages of change after the extended follow-up period. Fifteen of the 16 informants (94%) indicated that they maintained changes in beliefs and all informants held to their contention that the intervention had had positive effects for them. This long-term examination extends the support of individual counseling based on stage classification, the transtheoretical theory, cognitive and behavioral counseling. Reports of short-term change following such interventions have previously been reported by several authors who have examined physician counseling (Calfas, Sallis, Olenburg & Ffrench, 1997; Calfas, Long, Sallis, Wooten, Pratt & Patrick, 1996; Long, Calfas, Wooten, Sallis, Patrick, Goldstein, Marcus, Schwenk, Chenoweth, Carter, Torres, Palinkas & Heath, 1996). Several barriers reported by this group of authors suggest that physicians can play an important role in initiating behavior change, but allied health professionals need to play a role in providing continued counseling and support for individuals who make a choice to change their physical activity behavior. That contention is supported here. Lack of time, reimbursement and understanding of activity behavior are barriers to overcome within the established health care system. The findings of the present studies suggest that it is overly optimistic to expect long-term changes following three to five minutes of structured counseling as suggested by the physician counseling programs. The role of physicians may be more effective as supporters of the initiators of change for patients. Physicians may at that point work around the reported barriers by referring patients to allied health professionals with the time and expertise to provide individual counseling.

The in-depth nature of the current studies is a second strength. The qualitative interviews provide information supporting the effectiveness of the 12-week intervention comprised of four counseling sessions and an eight-week follow-up. The informants suggested that extending the intervention would be an improvement. A relationship between the intervention and changes in beliefs and behavior change was suggested in the in-depth interviews which were repeated on three occasions Connections between the intervention and changes were substantiated by the informants when they reviewed the interpretations proposed by the researcher. Attention was paid to the collection of data with structured interviews followed by carefully planned content analysis. The design allowed attention to be directed at the process as well as the outcome of the intervention. This inductive analysis permitted an in-depth understanding of what things happened and why they happened. The dual approach strengthens support for the effectiveness of the intervention. The current research however, is unable to clearly establish what aspects of the intervention program led to the noted changes. Future experimental research with systematic controls is indicated to determine which elements of the intervention program were most critical and whether the effectiveness of the program is generalizable across different counselors and to broader participant groups.

The use of multiple measures of behavior provided methodological strength. Reports of stage classification were expanded by detailed seven-day recall of physical activity. The seven-day recall provided a reliable and valid evaluation of physical activity levels from moderate to vigorous (Sallis, Haskell, Wood, Fortmann, Rodbers, Blair & Paffenbarger, 1985; Dishman & Steinhardt, 1988; Gross, Sallis, Buono, Roby & Nelson, 1990). Patterns of activity change were supported by changes in fitness trend and clinically significant changes in fitness. Qualitative interviews provided detail on why changes occurred or failed to transpire.

There were limitations to this program of research. The first limitation encountered was a difficulty in recruiting precontemplators for involvement in the counseling intervention. This failure to recruit precontemplators limited the evaluation of specific counseling to aid their progress along the stage of change continuum. There is a positive side to this finding. It suggests a need to approach precontemplators with different interventions or from different perspectives. The use of structured physician counseling may be one possibility for an approach (Calfas, Long, Sallis, Wooten, Pratt & Patrick, 1996).

Preliminary classification by informants proved to be inadequate. Although this may be a learning process for informants, there are suggestions that would improve investigations of physical activity stage. Logging of activity would provide a realistic base for informants to self-rate their stage. Examples of activities that fulfill the criteria for the intensity of physical activity under study should be included in the complete definition provided for informants to judge their stage. Because physical activity is not a discrete behavior like smoking it is important to ensure that the behavior is sufficiently understood by those being asked to self-evaluate their behavior.

The single-subject research in the second study was limited by two factors. A lack of objective measurement limited the accuracy of reported intensities and duration of strictly defined exercise. Informants did not comply with advancing criteria for intensity and duration of physical activity. The informants reported difficulty monitoring the intensity of their physical activity and at times reported forgetting to attend to the duration of activity within the prescribed target heart-rate range. This need for objective measures of physical activity was demonstrated in previous single-subject research while investigating individual activity counseling (Hudec, 1991). Depending on the level of physical activity, heart-rate monitors, motion sensors, or pedometers could be valuable tools for single-subject inquiry. In future research where single-case designs are used it is critical to have objective measurement of physical activity. Without objective measurement and close supervision, it is difficult to ensure control over extraneous variables. Without that control, cause and effect relationships cannot be established. Close supervision of activity is required to ensure compliance with the criteria set for intensity and duration of activity. Without this close supervision of criteria, the use of single-subject changing criteria designs is not practical. It must also be considered that such rigor might affect the perceptions of the counseling program. The client-centred, soft-sell attractiveness may suffer.

With a heavy reliance on self-report during these studies there was a danger that informants who wished to provide favorable results to the researcher who was also the counselor might temper their reports. Social desirability could occur as a normal human reaction to someone who is helping him or her. Because confounding social desirability was a concern two steps were taken. During the development of rapport early in the counseling an atmosphere of confidentiality and honesty was established to encourage disclosure and honest evaluation of the intervention. In addition to this early step another step was taken late in the data gathering. The independent critique was completed by the informants on paper rather than during an interview. A cover page highlighting the importance of an honest critique accompanied it. The importance of both negative and positive comments was promoted. These two measures were incorporated to increase the likelihood of honest self-report. However, despite efforts to minimize the effects of social desirability as a confounding factor, its actual impact during these studies is unknown.

Recommendations for Future Research

Based on the findings of this research program, its strengths and limitations, several suggestions for future research can be forwarded. Using additional methodologies and focusing on quantitative change could support the use of counseling interventions based on the theories proposed for the current interventions. Further research should extend the findings of this research program by applying counseling to diverse populations in various settings. Examining this counseling strategy in natural situations and clinical settings would provide information about the practical application of individual counseling interventions. Application of counseling as an adjunct to physician advice is one clinical application deserving attention.

Stage classification needs continued attention. The use of activity logging prior to classification in conjunction with extended definitions of the physical activity behavior should be applied and evaluated. If interventions are to be effectively applied based on self-evaluation of change behavior, discrete behaviors need to be clarified to the individual and clients need to be equipped to realistically evaluate their behavior as a precursor to categorizing their stage of change.

The current research effort experienced difficulty convincing precontemplators to become involved in counseling. A series of qualitative interviews should explore the needs of precontemplators and gather ideas to facilitate stage movement in those who are not considering physical activity because of reluctance, rebellion, resignation, or rationalization (DiClemente, 1991). Although counseling was an effective intervention for the precontemplator involved in study one, interviews should explore the possibilities for individual intervention as compared to social health promotion or mass-media campaigns.

Exploration of practical ways to maintain the motivation developed during counseling should be conducted (Janis, 1983). Informants suggested a need for continued contact to facilitate their motivation to be active. Although continued counseling may not be cost effective, there are other possibilities. Establishment of active networks, partnerships and mentors should be evaluated as a means of continuing active lifestyles. Some evidence indicates that mediated interventions are more effective than face-to-face or combined programs for facilitating activity involvement (Dishman and Buckworth, 1996). Further research should be conducted into the use of face-to-face counseling approaches in conjunction with other approaches. Attention should be given to the use of media-based, mail, or telephone delivered interventions to reach the reluctant and extend the motivation of direct interventions.

This program of research suggested connections between changes in beliefs towards physical activity and changes in behavior. The theory of planned behavior provided the basis for investigation of connections between beliefs and changes in physical activity behavior (Ajzen, 1991). Although this theory suggests that beliefs influence the intention to be active which is a precursor to behavior change, allowance is made for a direct relationship between perceived behavioral control and behavior. The current research did not attempt to support or reject the theory of planned behavior. Rather the theory was used as a rationale for changing beliefs as a pathway to influencing behavior. The qualitative inquiry suggested that other factors such as the personal situation can impact behavior. The inquiry also suggested that the relationship between beliefs and behavior is not unidirectional. Both of these suggestions are consistent with the theory of planned behavior. Informants suggested that experience with physical activity during the intervention affected their beliefs. A specific discovery of the inquiry was that acceptance of both situational and personal effects on motivation was an indication of readiness for independent success. Continued investigation should examine the specific individual nature of belief change. The current research proposed that changes in beliefs were very individually connected to change in behavior. Focus should be directed on how to discover the necessary attitudinal changes for application in personalized counseling interventions.

Recently, it has been suggested that behavioral research applied to physical activity and health should consider five phases (Sallis & Owen, 1999, chap. 1). First, links should be established between physical activity and health. Next, methods of accurate and sensitive measurement of physical activity should be established. Third, the factors that influence the level of physical activity should be identified. Fourth, evaluation of interventions to promote physical activity should be conducted. Finally, research should be translated into practice. This qualitative inquiry touched on each of these phases but concentrated on measurement, influences, evaluation and translation into practice. An attempt was made to discover what could be learned from the application of an intervention based on a combination of the transtheoretical, short-term counseling and motivational interviewing models to enhance the ability of counselors to apply future interventions to each of the stages of change. Stage of change theory, short-term counseling and motivational interviewing successfully provided a base for application of an intervention. The qualitative nature of the research design provided an in-depth evaluation of the intervention effects. The qualitative interpretations suggest many important questions about counseling interventions and the methodology required to investigate them. Suggestions for practical clinical interventions and continued research were provided.

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Appendix A

Interviewing Protocol

Interviewing Protocol

The questions below are the essential questions. Extra questions will be added to encourage and extend the discussion. Spontaneous questions may be added when necessary and then documented.

Questions to be asked at initial interview and subsequent interviews.

1. What stages do people go through in changing a behavior?

   Review stages of behavior generally, their assessed stage, previous and the subsequent stage.

2. What contributed to your move into your current stage?
3. What would help you move from __________ (current stage) to __________ (the next stage)?
4. What would you suggest to help others in your current stage advance closer to achieving behavior change.
5. What would you suggest to help others that are now in ________ (previous stage) move forward as you have?
6. What individual and situation factors need to be overcome by individuals in your current stage?
7. How can counseling be tailored to meet your individual and situation needs?

Questions to be asked during subsequent interviews.

1. In general, has this counseling helped you, made little difference to you, or interfered with your behavior change?
2. In what ways has the counseling helped you, or aided your progress toward behavior change?
3. In what ways has the counseling discouraged you, or interfered with your progress towards behavior change?
4. What additions would you suggest to increase the effectiveness of the counseling you have been through?
5. What components would you remove or reduce in the counseling program?
6. What would you say to others like you to assist them to make progress toward behavior change?

Appendix B

Attitude Assessments

Physical Activity Attitude Assessment (Ajzen & Driver, 1991)

We are interested in your thoughts and feelings about your participation in regular physical activity. Please indicate with a mark in the appropriate circle the degree to which you agree or disagree with each of the following statements. Please only make one choice for each line and answer ALL questions.

1. I think that participating in physical activity is:

Foolish	○	○	○	○	○	○	○	Wise
Harmful	○	○	○	○	○	○	○	Beneficial
Useless	○	○	○	○	○	○	○	Useful
Strong	○	○	○	○	○	○	○	Weak
Active	○	○	○	○	○	○	○	Passive

2. I think that participating in physical activity is:

Boring	○	○	○	○	○	○	○	Interesting
Enjoyable	○	○	○	○	○	○	○	Unenjoyable
Unpleasant	○	○	○	○	○	○	○	Pleasant
Good	○	○	○	○	○	○	○	Bad
Attractive	○	○	○	○	○	○	○	Unattractive
Desirable	○	○	○	○	○	○	○	Undesirable
Ugly	○	○	○	○	○	○	○	Beautiful

3. For me participating in regular physical activity is:

Easy	○	○	○	○	○	○	○	Difficult

4. I believe that I have the resources to perform regular physical activity:

True	○	○	○	○	○	○	○	False

5. Most people that are important to me approve/disapprove of my engaging in regular physical activity:

Approve	○	○	○	○	○	○	○	Disapprove

6. Most people who are important in my life think I should engage in regular physical activity:

Likely	○	○	○	○	○	○	○	Unlikely

Qualitative Attitude Assessment (Ajzen & Driver, 1991)

This list of essential questions will form the basis for evaluation of attitudes and beliefs. Additional questions and optional questions will be posed to facilitate further information gathering if initial questions do not inspire discussion.

Instrumental beliefs will be investigated by the following two questions:

1. What are the possible costs or loses of physical activity?

2. What are the possible benefits or gains of physical activity?

Affective beliefs will be investigated by the following two questions:

3. What are the things you like or enjoy about physical activity?

4. What are the things that you dislike or hate about physical activity?

Control factors will be investigated by the following two questions:

5. What factors might facilitate your involvement in physical activity?

6. What factors might interfere with your involvement with physical activity?

Normative referents will be investigated by the following two questions:

7. Who serves to approve or encourage your involvement in physical activity?

8. Who serves to disapprove or discourage your involvement in physical activity?

Appendix C

Informed Consent

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH (Study 1)

Overview: I have been advised of the purpose of the research conducted by John Craig Hudec M.A. under the direction of Professor L.M. Wankel Ph.D., Faculty of Physical Education and Recreation, University of Alberta. These individuals can be contacted with concerns or questions by calling 492-2831 or E-Mailing jhudec@gpu.srv.ualberta.ca. I understand that the intent of the study is to provide me with assistance in establishing regular exercise as one part of a healthy lifestyle. My participation in this research is intended to demonstrate one method of assisting others who can improve their health status by adhering to exercise. My attitude concerning physical activity will be evaluated during interviews and by completion of questionnaires.

Intervention Program Objectives and Procedures: I understand that it will may be suggested that I consider activities to build the heart and lungs, muscular and skeletal systems, develop strength and flexibility and reduce excess body fat. Suggested exercise may include aerobic activity, strength training and stretching as suggested by an individual exercise prescription.

I will be asked to schedule four weekly meetings with a conditioning therapist plus two follow-up meeting. Meetings will last one hour or less. We will work together to improve my knowledge and understanding of fitness and establish self-responsibility for developing a more active lifestyle.

Description of Potential Risks of Physical Activity: I understand that the reaction of the heart, lungs and blood vessels to exercise cannot always be predicted. I know that there is a risk of abnormal changes occurring during or after exercise, including abnormal heart function , blood pressure and in rare instances heart attack or musculoskeletal injuries. The preliminary screening, exercise testing and a progressive program reduce the risk of these abnormalities. In addition the access to the expertise of a conditioning therapist weekly should allow discussion of any suspected problems. I understand that the program is unsupervised and that it is important to discuss any potential problems.

Description of Potential Benefits of Physical Activity: I understand that a program of regular exercise for the heart, lungs and muscles has many associated benefits. These include a decrease in excess body fat, improvements in blood fats and pressure, improvements in psychological functions such as the reaction to stress and decreased risk of heart disease.

Inquiries and Freedom of Consent: I have read the above information and understand it. Questions concerning the procedures have been answered to my satisfaction. I am free to deny answering any questions throughout the procedure and can discontinue participation in any procedures or the entire study without fear of consequences, prejudice, or penalty. I understand that the information derived from this testing is confidential and will only be released with my permission. I agree that the information obtained during this research may be used for scientific purposes and publication with my right for privacy ensured. Data will be coded to ensure security. Names will be excluded from all publications and presentations.

Participant's Signature________________________Date________

Witness Signature_____________________________Date_______

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH (Study 2)

Overview: I have been advised of the purpose of the research conducted by John Craig Hudec M.A. under the direction of Professor L.M. Wankel Ph.D., Faculty of Physical Education and Recreation, University of Alberta. These individuals can be contacted with concerns or questions by calling 492-2831 or E-Mailing jhudec@gpu.srv.ualberta.ca. I understand that the intent of the study is to provide me with assistance in establishing regular exercise as one part of a healthy lifestyle. My participation in this research is intended to demonstrate one method of assisting others who can improve their health status by adhering to exercise. My attitude concerning physical activity will be evaluated during interviews and by completion of questionnaires. My physical activity behavior will be monitored and I will take part in an evaluation of my fitness.

Fitness Testing Objectives: I understand that the tests to be administered during this research are for the purpose of determining my physical fitness status, including heart, lung and blood vessel capacities for whole body activity, ratio of body fat to lean tissue, muscular endurance and strength and joint flexibility.

Explanation of Fitness Testing Procedures: I understand that the tests which I will undergo will be performed by only trained personnel. The cardiovascular test will be conducted by stepping to a cadence until a predetermined submaximal heart-rate is achieved. Body composition will be determined through the use of skin-folds. Muscular endurance will be measured through the use of calisthenics and/or equipment. Range of motion movements will be utilized to determine flexibility.

Description of Potential Fitness Testing Risks: I understand that there exists the possibility that abnormal changes may occur during the testing procedures. These changes could include abnormal heart beats, abnormal blood pressure response, in rare cases, heart attack and various muscle or joint injuries. Every effort is made to minimize these possibilities through preliminary screening, medical examination and close observation by trained professionals throughout the tests.

Benefits to be Expected from Fitness Testing: I understand that the results of this testing will aid in determining my present physical fitness status and in determining potential health hazards. These results will be utilized to develop an individualized exercise prescription in conjunction with personal preferences.

Intervention Program Objectives and Procedures: I understand that it will may be suggested that I consider activities to build the heart and lungs, muscular and skeletal systems, develop strength and flexibility and reduce excess body fat. Suggested exercise may include aerobic activity, strength training and stretching as suggested by an individual exercise prescription.

I will be asked to schedule four weekly meetings and two follow-up meeting with a conditioning therapist. Meetings will last one hour or less. We will work together to improve my knowledge and understanding of fitness and establish self-responsibility for developing a more active lifestyle. In the interest of research I understand that my physical activity may be monitored by machine and by spousal-report and that I will be asked to keep a log and recall weekly activity.

Description of Potential Risks of Physical Activity: I understand that the reaction of the heart, lungs and blood vessels to exercise cannot always be predicted. I know that there is a risk of abnormal changes occurring during or after exercise, including abnormal heart function , blood pressure and in rare instances heart attack or musculoskeletal injuries. The preliminary screening, exercise testing and a progressive program reduce the risk of these abnormalities. In addition the access to the expertise of a conditioning therapist weekly should allow discussion of any suspected problems. I understand that the program is unsupervised and that it is important to discuss any potential problems.

Description of Potential Benefits: I understand that a program of regular exercise for the heart, lungs and muscles has many associated benefits. These include a decrease in excess body fat, improvements in blood fats and pressure, improvements in psychological functions such as the reaction to stress and decreased risk of heart disease.

Inquiries and Freedom of Consent: I have read the above information and understand it. Questions concerning the procedures have been answered to my satisfaction. I am free to deny answering any questions throughout the procedure and can discontinue participation in any procedures or the entire study without fear of consequences, prejudice, or penalty. I understand that the information derived from this testing is confidential and will only be released with my permission. I agree that the information obtained during this research may be used for scientific purposes and publication with my right for privacy ensured. Data will be coded to ensure security. Names will be excluded from all publications and presentations.

Participant's Signature________________________Date________

Witness Signature______________________________Date________

Appendix D

Physical Activity and Exercise Assessment

Comprehensive Activity Assessment (Sallis et al., 1985)

A. Moderate Activities # __________

Do you usually participate in any of the following activities?

○ climbing some stairs for exercise instead of taking the elevator

○ walking instead of driving a short distance

○ parking away from your destination so you have to walk more

○ walking on your lunch hour or after dinner

○ getting off at a bus stop which is not the one nearest your destination and walking

○ other ____

B. Vigorous Activities # __________

For the **last three months** which of the following activities have you performed regularly?

○ jog or run at least 16 km. (10 miles) per week

○ play strenuous racquet sports (singles tennis, squash, etc.) at least five hours per week

○ play other strenuous sports (basketball, soccer, etc.) at least five hours per week

○ ride a bicycle at least 80 km. (50 miles) per week

○ swim at least 3 km. (2 miles) per week

C. Total Physical Activity

Now we would like to know more about your physical activity during the past seven days. But first let me ask you about your sleep habits and how long you sit each day.

1. On the average how many hours did you sleep each night during the **last five weekday nights** (Sun-Thur)? _____hours

2. On the average how many hours did you sleep each night **last Friday and Saturday nights**? _____hours

3. On average how many hours did you sit each day during the **last five weekdays** (Mon-Fri)? (Probe: Think of the hours you spend at a desk, a computer, driving, watching TV, eating, etc.) _____hours

4. On average how many hours did you sit each day **last Saturday and Sunday**? (Probe: Think of the hours you spend at a desk, a computer, driving, watching TV, eating, etc.) _____hours

Now I am going ask you about your physical activity during the past seven days, that is the last five weekdays and the past weekend, Saturday and Sunday. We are **not** going to talk about light activities such as slow walking, light housework, or unstrenuous sports such as bowling, archery, or softball. Please look at the list which shows some examples of activities which we consider light, moderate, hard and very hard (Interviewer hands the subject a card and allows time to read it over). People engage in many other activities, if you are not sure of where your activity fits, please ask me about it.

5. First, let's consider moderate activities. What activities did you do and how many total hours did you spend during the **last five weekdays** doing these moderate activities or others like them? Please tell me to the nearest half hour. _____hours

6. **Last Saturday and Sunday**, how many hours did you spend on moderate activities and what did you do?(Probe: Can you think of any other sports, jobs, or household activities that would fit into this category?) _____hours

7. Now, let's consider hard activities. What activities did you do and how many total hours did you spend during the **last five weekdays** doing these hard activities or others like them? Please tell me to the nearest half hour. _____hours

8. **Last Saturday and Sunday**, how many hours did you spend on hard activities and what did you do?(Probe: Can you think of any other sports, jobs, or household activities that would fit into this category?) _____hours

9. Now, let's consider very hard activities. What activities did you do and how many total hours did you spend during the **last five weekdays** doing these very hard activities or others like them? Please tell me to the nearest half hour. _____hours

10. **Last Saturday and Sunday**, how many hours did you spend on very hard activities and what did you do?(Probe: Can you think of any other sports, jobs, or household activities that would fit into this category?) _____hours

11. Compared with your physical activity offer the **past 3 months**, was **last week's** physical activity more, less, or about the same?

○ more ○ less ○ about the same

Interviewer: Please list below any activities reported by the subject which you don't know how to classify. Flag this record for review and completion.

Activity (brief description)	Hours: workday	Hours: weekend day
________________	____________	________________
________________	____________	________________
________________	____________	________________

Examples of Activities in Each Category

Moderate activity

Occupational tasks: 1) delivering mail or patrolling on foot; 2) house painting; and 3) truck driving (making deliveries and carrying light objects).

Household activities: 1) raking the lawn; 2) sweeping and mopping; 3) mowing the lawn with a power mower; and 4) cleaning windows.

Sports activities (actual playing time): 1) volleyball; 2) Ping-Pong; 3) brisk walking for pleasure or to work 4.83 or 3 miles/hour); 4) golf, walking and pulling or carrying clubs; and 5) calisthenics exercises.

Hard activity

Occupational tasks: 1) heavy carpentry; 2) construction work, doing physical labor.

Household tasks: 1) scrubbing floors.

Sports activities (actual playing time): 1) tennis doubles; and 2) fast, square, or folk dancing.

Very hard activity

Occupational tasks: 1) very hard physical labor, digging or chopping with heavy tools; and 2) carrying heavy loads such as bricks or lumber.

Sports activities (actual playing time): 1) jogging or swimming; 2) singles tennis; 3) racquetball; and 4) soccer.

8

Exercise Self-Report Form

Client Number __________ Week # __________

Day _______________ Date _______________

Exercise Type ______________________________

Exercise Intensity

Pulse #1 ____/10 sec. Pulse #2 ____/10 sec.

Exercise Description

Total activity time _____ min. (include warm-up & cool-down)

Exercise duration ______ min. (at target heart rate)

Perceived Exertion(circle one)

0	nothing at all
0.5	very, very weak
1	very weak
2	weak
3	moderate
4	somewhat strong
5	strong
6	
7	very strong
8	
9	
10	very, very strong
*	maximal

Feeling Scale(circle one)

+5	very good
+4	
+3	good
+2	
+1	slightly good
0	neutral
-1	slightly bad
-2	
-3	bad
-4	
-5	very bad

Comments

____

____

Appendix E

Stage Assessment

Stages of Change Questionnaire

Please check the one statement that best represents your current exercise behavior.

** Regular exercise is defined as participating in exercise three or more times per week for at least twenty minutes each time.

( ) "I currently do not exercise and I do not intend to start exercising in the next six months."

( ) "I currently do not exercise but am thinking about starting exercising in the next six months."

( ) "I currently exercise some but not regularly."

( ) "I currently exercise regularly, but I have only begun doing so within the last six months."

( ) "I currently exercise regularly and have done so for longer than six months."

Appendix F

Details and Sources for Interventions

Planned Intervention to Early Stages

Study One

Precontemplation

Personal benefits & positive consideration of activity (PACE, 1992).

A typical day, current lifestyle & stresses, where does activity fit or not fit in the day, how does inactivity affect your health (Rollnick et al., 1992).

Reasons to stay inactive, reasons to be active, pros & cons of physical activity (Miriam Hospital, Marcus, 1992).

Increase awareness, pros for physical activity & discussion on habit (Naylor & Wheeler, 1995).

Encourage consideration of physical activity, summarize benefits, relate benefits to personal health status, patient lists reasons to be active, patient identifies barriers, clear advice from physician to consider activity (PACE Manual, 1992).

Encourage consideration, summarize benefits, relate benefits to health, patient lists personal reasons, patient lists barriers, patient identifies ways to get around barriers, clear advice from physician (Naylor & Simmonds, 1994).

Benefits and barriers, Identify activities that client likes (Squamish).

Provide knowledge, reduce insecurities and fears, provide choices, instill hope, explore barriers, separate reasons from rationalizations (Diclemente, 1991).

Contemplation

Set initial activity goal, 2 main benefits, list activities enjoyed, identify family or other supporters, specific program details, reinforce benefits and address barriers (PACE, 1992).

Good things/less good things, providing information (Rollnick et al., 1992).

Reasons to become more active and to remain inactive, planning to become more active, healthy ways to be active, your personal plan (Miriam Hospital, Marcus, 1992).

Increase intention, address ambivalence, highlight specific benefits, build self-esteem (Naylor & Wheeler, 1995).

Develop specific plan to begin, clear physician advice to begin, anticipated benefits, choose appropriate preferred activity, identify social support, identify barriers, rate confidence to become physically active, follow up with future appointments (some of these apply to preparation as well) (PACE Manual, 1992).

Specific plans, identify anticipated benefits, patient chooses preferred and appropriate activity, identify social supporters (Naylor & Simmonds, 1994).

Planning for activity, choosing activity (Squamish).

Reward/risk analysis, decision balance considerations, information and incentives (positive), anticipate barriers, increase self-efficacy (Diclemente, 1991).

Preparation

Providing information, exploring concerns, help with decision making (Rollnick et al., 1992).

Benefits, planning to become regularly active, the healthy way, overcoming obstacles (Miriam Hospital, Marcus, 1992).

Help client plan, set target date, focus on pros, provide resources (Naylor & Wheeler, 1995).

Turn activity into a habit, review current program, identify barriers, solutions to barriers, review reasons to be active, develop continued action plan (Naylor & Simmonds, 1994).

Assess strength of commitment, anticipate barriers, develop coping skills and activities (Diclemente, 1991).

Planned Intervention to Later Stages

STUDY TWO

Action

Provide praise and congratulations for the initiation of activity, review the 3 main benefits to date and possibilities to increase enjoyment (PACE Manual, 1992).

Provide continued help with decision making (Rollnick, 1992).

Concentrate on benefits, a healthy lifestyle, staying motivated, rewards, overcoming obstacles and supporting confidence (Miriam Hospital, Marcus, 1992).

Construct a plan to continue progress and outline rewards (Squamish).

Support the client, while providing relapse prevention training and skills to deal with lapses (Naylor & Simmons, 1994).

Reward with praise, identify social support, identify barriers to prevent relapse, then provide solutions to barriers, rate confidence and arrange follow-up appointments (PACE Manual, 1992). (Some of these apply more to maintenance.)

Praise accomplishment, review benefits and the current program, identify social supporters, barriers and solutions, rate the confidence to continue and develop a plan to continue (Naylor & Simmons, 1994). (Some of these apply more to maintenance.)

Develop self efficacy, establish external monitoring, focus on success and provide successful modeling (DiClemente, 1991).

Maintenance

Provide relapse prevention, identify interfering situations, plan to avoid lapses and get quickly back on track (PACE, 1992).

Reemphasize benefits, tips for staying healthy and avoiding injury, stay on track and prepare to keep going (Miriam Hospital, Marcus, 1992).

Support maintenance, prevent relapse by preparing for periods of lapse, refine and add program variety (Naylor & Wheeler, 1995).

Revise both long-term and short-term goals, teach relapse prevention and plan for lapses (Squamish).

Exploration of success and failure, provide feedback and requested information, express empathy and teach relapse prevention (DiClemente, 1991).

Appendix G

Baseline Instructions

Baseline Instructions

To initiate this study the first step is to collect information on your regular pattern of physical activity. To satisfy this goal we are asking you to collect information on your exercise activity for a period of 3-6 weeks. Here are some tips to complete this collection of information:

- Try not to change your behavior just because you are measuring your own exercise.
- Each time you exercise complete an Exercise Self-Report Form.
- Exercise type is the form your exercise takes (ie running, walking, swimming, squash, etc.).
- Exercise intensity is based on the target heart rate that you have been provided. Try to take your pulse two times during or immediately following your activity.
- Record a judgment of your perceived exertion and how you feel during the exercise.
- Include any comments that apply to your exercise session in the space provided or on the back of the sheet.

Questions or problems call John Hudec at 468-0992 or e-mail jhudec@gpu.srv.ualberta.ca

Appendix H

Individual Critique

Dear Study Participant:

I am contacting you one last time in regard to the physical activity research project you were involved in. **I need to ensure that I have represented your comments fairly.** Your participation to this point was very much appreciated. I have one more contribution for you to make. **My research design requires you to critique the data I have gathered**. I have tried to provide a structure that will require you to invest only a short time to provide me with this valuable information.

I have enclosed a summary of the information on physical activity you provided during our conversations in the past. Your taped comments were transcribed so that the information could be focused. Data has focused on three areas: 1)The Intervention Effects, 2)Attitudinal Effects and 3)Your Advice for Others. In addition to these three concentrations I am also interested in finding out how active you are currently. Your comments are an integral part of this research. **Both your negative and positive comments are important so feel free to critique my interpretations.**

During the process of transcribing, focusing and interpreting the data I have contemplated some additional suggestions regarding ways you can initiate and maintain physical activity behavior. If you are interested in these suggestions I would be glad to share some ideas with you. Each of my subjects is critically important to my research. **Please assist me with this final step. Read the summary of your comments and make the comments you feel are appropriate.**

If their are questions or concerns please contact me at **468-0992** or e-mail me at **jhudec@gpu.srv.ualberta.ca.** Thank you very much for the contribution you are making to this research.

1. **Stages of Change Questionnaire**

Please check the one statement that best represents your current **exercise behavior**.

** Regular exercise is defined as participating in exercise three or more times per week for at least twenty minutes each time.

( ) "I currently do not exercise and I do not intend to start exercising in the next six months."

( ) "I currently do not exercise but am thinking about starting exercising in the next six months."

( ) "I currently exercise some but not regularly."

( ) "I currently exercise regularly, but I have only begun doing so within the last six months."

( ) "I currently exercise regularly and have done so for
longer than six months."

2. Please describe your current physical activity:

** **Physical activity** is defined as body movement that results in a substantial increase over resting energy expenditure.

3. How active are you currently as compared to prior to our first meeting? (check one)

○ more active ○ less active ○ about the same

4. Have you made changes in (a) how you value physical activity or (b) how you integrate activity into your daily life? (describe)

(Each section of the interpretations was inserted in turn here.)

Please comment on the previous section. Are there any discrepancies, omissions, additions, or general comments that should be noted?

Please circle the descriptor that best describes the degree to which the above comments represent your perception of what you stated during the interviews.

strongly disagree	**disagree**	**neither agree or disagree**	**agree**	**strongly agree**